

Public Utilities



Volume 59 No. 4

February 14, 1957

A PARTNERSHIP PLAN FOR ATOMIC POWER DEVELOPMENT

By Robb M. Winsborough

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Cost as a Basis for Gas Field Price Fixing

By Charles H. Frazier

« »

Antitrust Policy: A Study in Contradiction

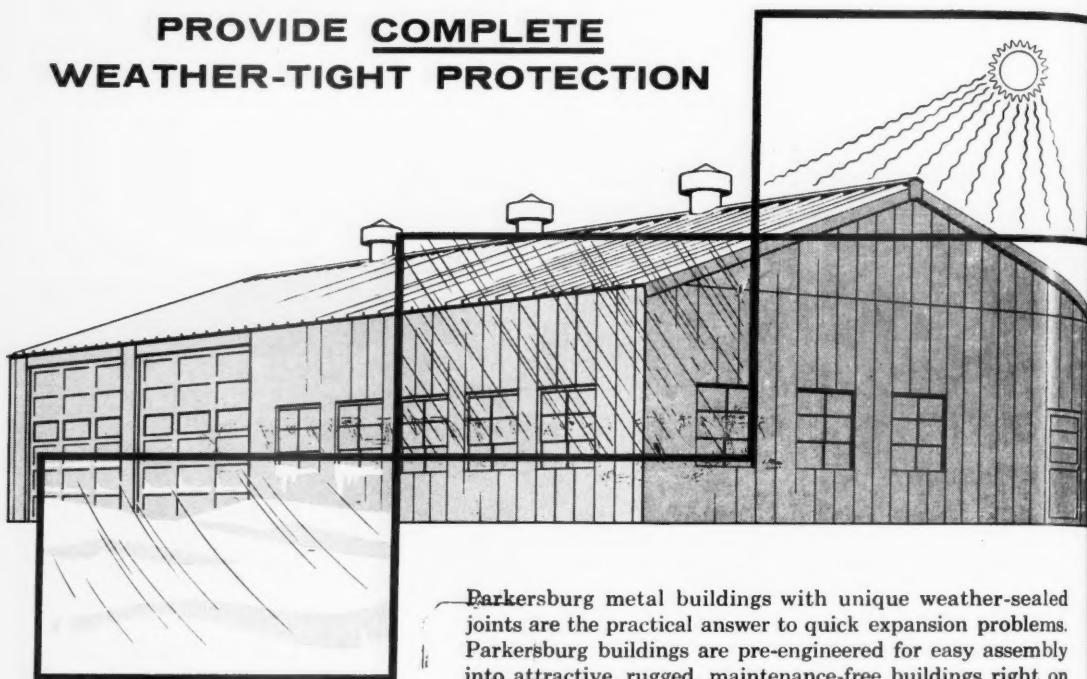
By Donald I. Rogers

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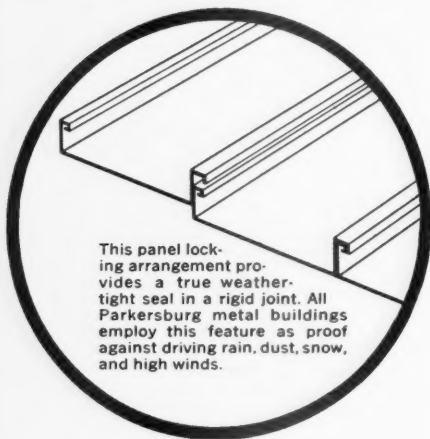
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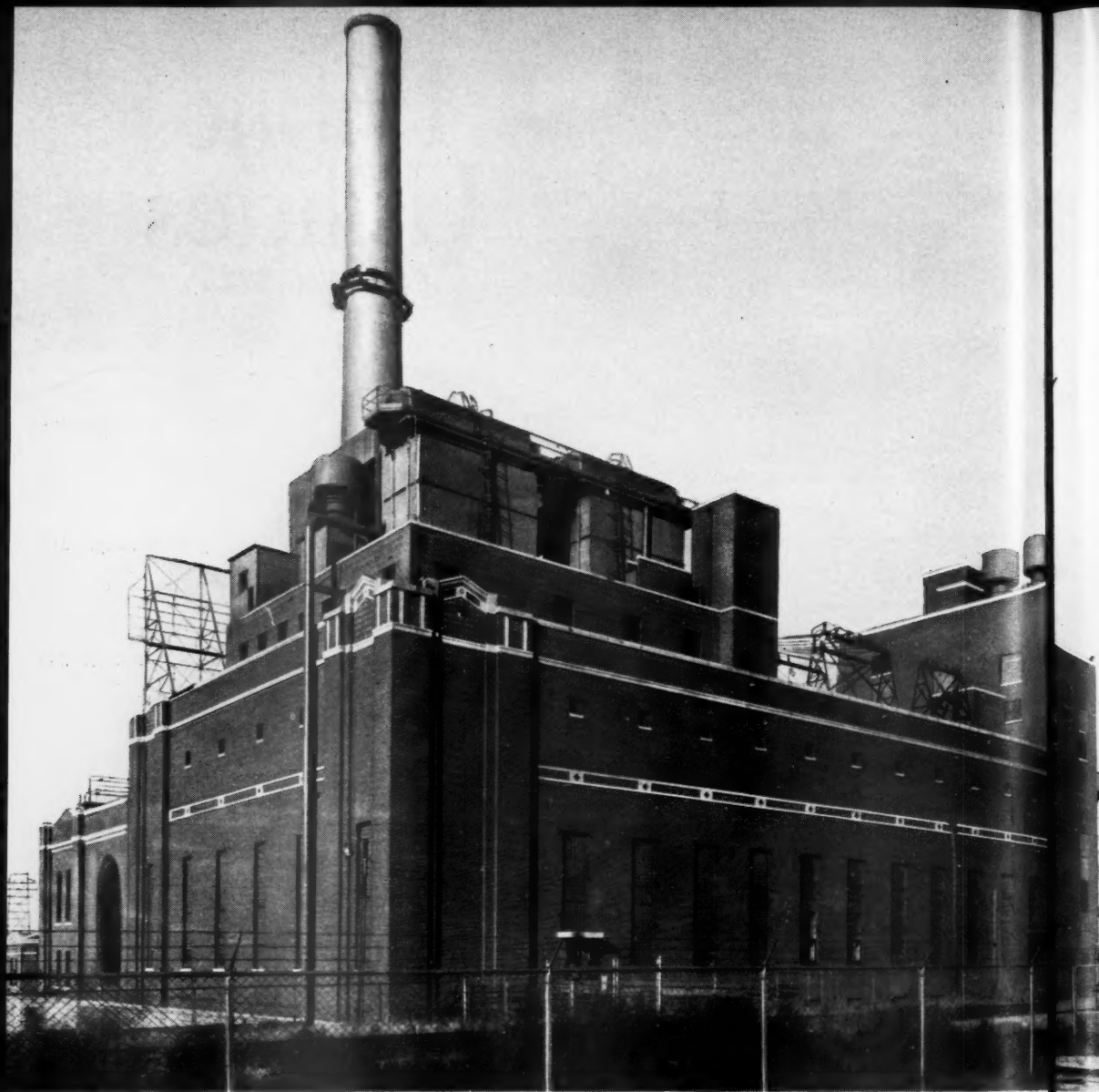
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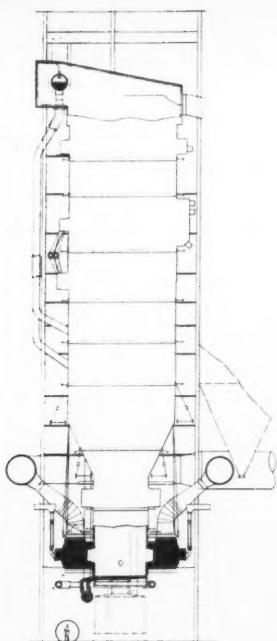
New Cyclone Furnace Unit For

**Installation at Joliet Station
to Bring Higher Efficiency
... Lower Costs to
Power Generation**

Commonwealth Edison System's newest addition, at its Joliet Station, will be a B&W Radiant Reheat Boiler with Cyclone Furnaces. This is the 16th unit of this type the system has bought since 1944 and raises total system capacity served by Cyclone-fired units to over 1,600,000 kw.

Early in the development of the Cyclone Furnace by B&W, Commonwealth Edison recognized its potentialities for burning low-grade coals. The system's engineers and operators cooperated with B&W in the project, and, in September 1944, the

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B&W RADIANT REHEAT BOILER WITH CYCLONE FURNACES, arranged for opposed firing, for Commonwealth Edison System's Joliet Station. Unit will deliver 2,200,000 pounds of steam per hour at 2100 psi with temperature of 1055 F, reheat to 1005 F. Boiler design is 2375 psi. Sargent & Lundy, Consulting Engineers.

CYCLONE FURNACE BOILER UNITS IN COMMONWEALTH EDISON SYSTEM

STATION	NO. OF BOILERS	NO. OF CYCLONES	TOTAL CAPACITY LB/HR	DESIGN PRESSURE	STEAM TEMP. F	REHEAT TEMP. F
Calumet	1	1	150,000	600	650	—
Waukegan	1	2	300,000	650	760	—
Fisk	2	8	1,500,000	1475	935	—
Joliet	2	6	1,200,000	1525	1010	—
Ridgeland	4	16	2,920,000	2125	1050	—
Waukegan	1	4	830,000	2050	1010	1010
Ridgeland	2	12	2,200,000	2125	1050	1000
Will County	2	10	2,400,000	2125	1050	1010
Joliet	1	9	2,200,000	2375	1055	1005
	16	68	13,700,000			

it For Commonwealth Edison

on, a first commercial application went on the line at Calumet Station. Historic Boiler Unit No. 20-A, like the new unit at Joliet, burns highly volatile Central Illinois coal with a high ash content and low ash-fusion temperature.

The Cyclone Furnace simplifies the entire process of coal preparation, combustion, ash segregation, and ash handling and effects savings in most of the elements of power generation costs.

In service or on order, 64 boilers with 220 Cyclone Furnaces throughout the country serve a

total capacity of over 6,600,000 kw. They merit examination in connection with your next installation. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y. G-820-CS



Pages with the Editors

WE hear a great deal these days about the so-called "partnership policy" of the Eisenhower administration. This program for joint participation by the federal government with state and local governments, as well as private enterprise, is not exactly new. For many years there have been various devices for encouraging local participation and responsibility through such measures as federal aid and federal loans.

It is the degree of emphasis, however, which the President places on local responsibility and self-help which distinguishes it from the more direct federal government approach of predecessor administrations. The President has hammered away at this theme again and again in his campaign speeches, in policy statements, in the field of natural resource development. His recent Budget message contained the following restatement of the partnership policy:

THE development and conservation of the resources of America are vital to the present and future strength of the nation. They must be a concern not only of the federal government, but of everyone. Individual enterprise and state and local participation are essential to effective development of the na-



DONALD I. ROGERS



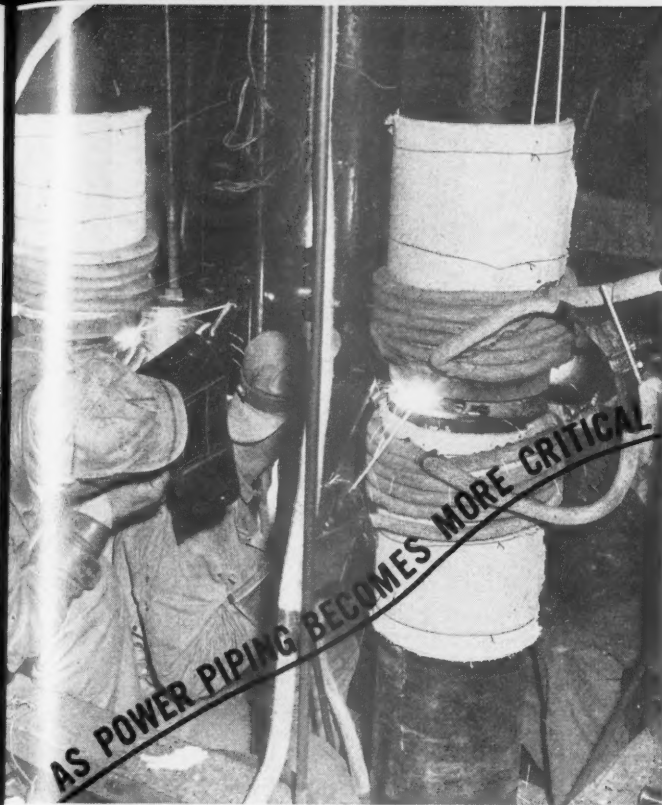
Fabian Bachrach

ROBB M. WINSBOROUGH

tion's soils and forests, water, minerals, fuels, and fisheries.

It now appears that partnership policy will not be confined to activity in the field of natural resource development. Recent policy statements by Admiral Lewis Strauss, chairman of the Atomic Energy Commission, called for private business to join hands and share with the federal government the responsibility for developing peacetime and commercial uses for atomic energy.

ARE the business-managed electric companies dragging their feet in the development of nuclear reactors to be used in connection with atomic power development? During the past year party criticism from political sources has suggested that the electric industry is stalling if not actually obstructing a vigorous program which the Atomic Energy Commission ought to be aggressively promoting to develop low-cost electric power from nuclear plants. There have been fears expressed that, as a result, the United States is falling behind in the race with Soviet Russia, Great Britain, and others to arrive at the goal of an atom power plant which can compete economically with conventional type generation.



KELLOGG'S FIELD CONTROL KEEPS PACE

high and low pressure steam piping for the 3,000-kw turbine-generator at Appalachian Electric Power Company's Glen Lyn, Virginia, station was fabricated and erected by M. W. Kellogg—using local union labor. Initial steam conditions are 1050 F, 2000 psi, with reheat at 1050 F. Main steam lines are 2¼% chrome-1% molybdenum, 12¾ in. OD, 2¼ in. average wall thickness. To meet the exacting requirements of the American Gas and Electric Service Corporation and The M. W. Kellogg Company, close control of techniques and procedures was doubly important. At Glen Lyn, as elsewhere in the field, M. W. Kellogg's reputation for completing a power piping project efficiently and promptly is due to the right techniques, the right materials, the right equipment, and—equally important—the right men to train and supervise labor to Kellogg's special standards. We welcome the opportunity to demonstrate these unique abilities and facilities. Some of them, including K-Weld*, are described in our 12-page booklet, "For The Modern Central Power Station." Write for your copy.

(Above) An inspector on Kellogg's permanent staff supervises welding of main steam lines at the Glen Lyn Station. (Below) Controls for the gang of 40-kva stress relieving units at Glen Lyn provide a permanent record of preheating, concurrent heating, and stress relieving cycles, ranging from room temperature to 1350 F.



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PAGES WITH THE EDITORS (Continued)

IN the leading article in this issue, ROBB M. WINSBOROUGH, Chicago consultant with the Middle West Service Company, has made a careful analysis of these claims, as well as the record to date and the steps taken by private companies to carry their share of atomic power development for peacetime public use. His findings and conclusions suggest that co-operation, rather than rivalry or discrimination, is the only sensible key to American supremacy and success in the field of atomic energy development.

MR. WINSBOROUGH is a native of Missouri who grew up in Georgia and Texas, graduating from Rice Institute at Houston, Texas. He worked his way through college by writing for newspapers and trade journals and after his graduation he went to Tampico, Mexico, to learn the oil business. In 1926 he returned to journalism in the United States. He got into the public utility business in 1929 as director of public relations and advertising for the Southwestern Gas & Electric Company, Shreveport, Louisiana. He later became commercial manager of that company and a member of its board of directors. He transferred to Middle West Service Company in Chicago in 1938, to take charge of personnel matters, employee relations and public relations, and advertising. He played an important part in bringing the Electric Company Advertising Program (ECAP) into existence.

* * * *

IN his thought-provoking article beginning on page 233, and writing from the standpoint of one engaged in the gas distribution business, but expressing only his personal opinion, CHARLES H. FRAZIER of the Philadelphia Gas Works explores the possibilities and variations of cost price regulation in the field of natural gas production. MR. FRAZIER has been connected with the public utility industry for thirty years, beginning with the Southwestern Public Service Company in the Texas Panhandle. For the last twenty-five years, however, his connection has been with the United Gas Improvement Company at Philadelphia, where he is presently executive engineer of the Philadelphia Gas



Fabian Bachrach

CHARLES H. FRAZIER

Works. He is a graduate of Haverford College ('24) and Harvard Engineering School ('26).

* * * *

ON page 244, DONALD I. ROGERS, financial editor of the *New York Herald Tribune* and well-known writer in the field of business economics, discusses monopoly. He has written a brief but trenchant criticism of a government antitrust policy. MR. ROGERS is a native of Connecticut where he started his journalistic career on the *Torrington Register* and *Hartford Courant*. He then served with the *Providence Journal*, and while in Providence studied economics at Brown University, concentrating on business journalism and with time out for World War II duty as an Infantry sergeant, ROGERS joined the *Herald Tribune* business and financial staff, where, at the age of thirty-two, he became the youngest editor in this field.

IN addition to his department with the *Tribune*, ROGERS has written frequently for *Collier's*, *Coronet*, *This Week Magazine*, *The Saturday Evening Post*, and *Reader's Digest*. His best-selling book, "*Teach Your Wife to Be a Widow*," was recently supplemented with a new one, "*Save It, Invest It, and Retire*."

THE next number of this magazine will be out February 28th.

The Editors

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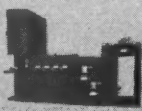
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Coming IN THE NEXT ISSUE

(February 28, 1957, issue)



WILL ATOMIC POWER SET THE REAL PARTNERSHIP PATTERN?

More and more we hear about the so-called "partnership policy" of the Eisenhower administration being extended to fields other than development of federal multipurpose projects with the participation of local interests. In recent weeks this principle has been frequently mentioned in connection with the development of peacetime uses for atomic energy. Eugene M. Zuckert, former member of the Atomic Energy Commission, has given a most provocative interview on this subject to Walter A. Shead, editor of "The Atomic Energy Guideletter." Mr. Shead, interviewing Commissioner Zuckert on behalf of PUBLIC UTILITIES FORTNIGHTLY, points out that businessmen who work with atomic energy will have to get used to the idea of operating in a field more regulated than ever before. Even public utility management people who have lived with commission regulation for years will find that they must co-operate with new and closer controls by the AEC. Private industry will be heavily dependent upon government for technical information, laboratory research, engineering guidance, and basic nuclear fuels.

ATOMIC ENERGY AND FREEDOM OF ENTERPRISE

Dr. John D. Garwood, professor of economics at Fort Hays Kansas State College, has taken a novel approach to outlining the function of private enterprise in the field of atomic energy in the future. The problems and by-products of this development are so vast and complicated, and the time is so short in which the right answers must be arrived at and practical programs worked out that creative thinking of a managerial type must go into high gear as of now. Unless it does, private enterprise may find it difficult to hold its proper place in the future.

ELECTRIC POWER SERVES THE ARMY

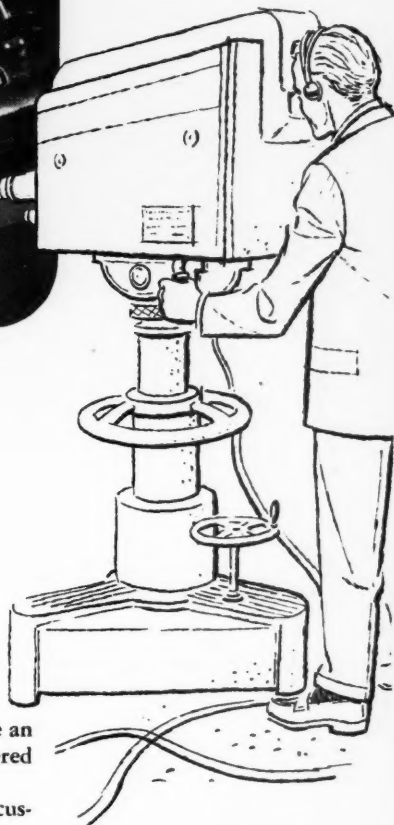
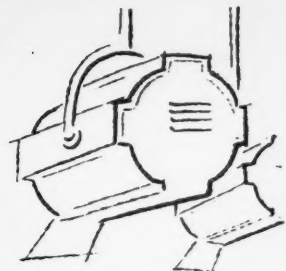
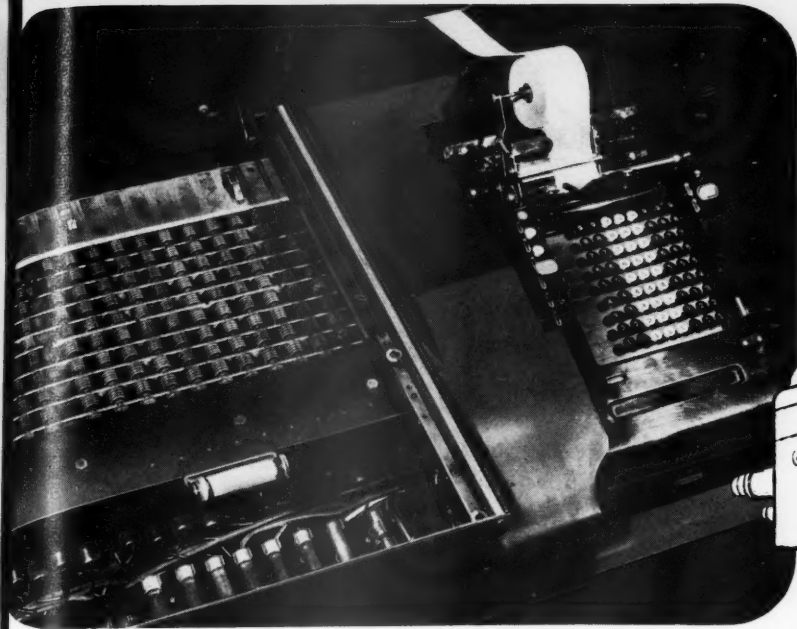
Uncle Sam's Army has an electric bill of nearly \$43 million a year that covers installations in the United States and overseas. Approximately 90 per cent of this is purchased from commercial sources. That makes the Army one of the electric utility industry's biggest and best customers. C. E. Zedaker, Jr., chief of the electrical branch of the utilities operations division of the Office of the Chief of Engineers, describes these and other interesting points about what happens when the commercial company kilowatts join the Army service.

DOES CONGRESS HAVE A GOVERNMENT POWER MANDATE?

In the present session of the 85th Congress, the claim has been made repeatedly by Senators and Representatives from the Pacific Northwest that the recent election resulted in a "mandate" for more federal power development. People from other areas unfamiliar with the local facts, may well be impressed by these claims, based on the election of certain Congressmen. But is there such a "mandate" actually? Can it be proven on the basis of the election last November? Kenneth McCord, on the staff of the Washington Water Power Company, Spokane, has analyzed the issues and the background of certain elections which are alleged to have resulted in the so-called "mandate," and his findings and conclusions give a very contrary impression.



Also . . . Special financial news, digests, and interpretations of court and commission decisions, general news happenings, reviews, Washington gossip, and other features of interest to public utility regulators, companies, executives, financial experts, employees, investors, and others.



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—MONTAIGNE

HARLOW H. CURTICE
*President, General Motors
Corporation.*

"... it has been demonstrated conclusively that the prosperity of our nation is not dependent on war or a peak level of defense expenditures."

EDITORIAL STATEMENT
Los Angeles Times.

"As long as the easy, attractive, superficial philosophy of statism remains in control of the citizen's mind, no beneficial social changes can be effected, whether by revolution or by any other means."

RICHARD M. NIXON
*Vice President of the United
States.*

"[It is time for a] showdown battle between those who would nationalize and socialize basic American institutions and those who would continue the American economic policies ... which have worked so well."

EDITORIAL STATEMENT
The Saturday Evening Post.

"It might be possible for [telephone] company research laboratories to come up with some electronic device that would automatically administer a shock to teen-age line hogs, perhaps at the expiration of forty minutes of treble 'homework' chitchatting and boying-and-girling."

HAROLD QUINTON
*President, Southern California
Edison Company.*

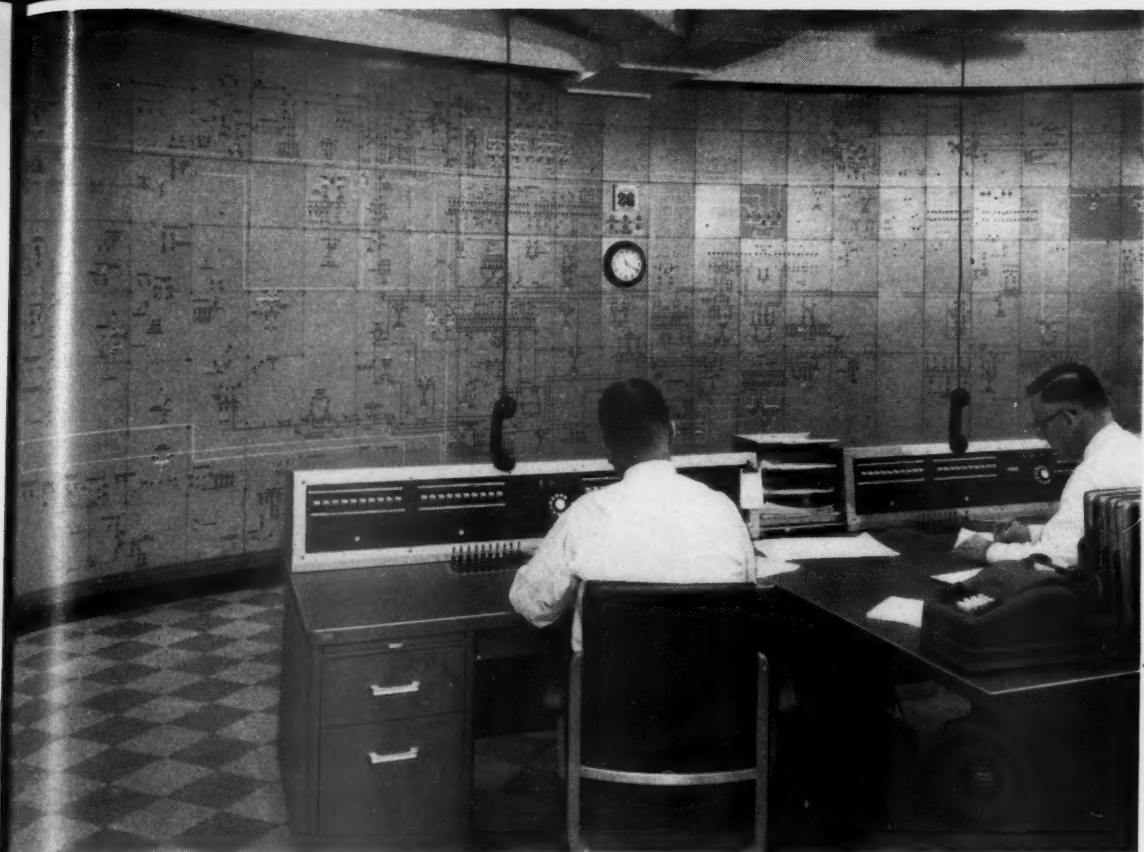
"I fully believe that the people of this country are coming to realize, as never before, that the advocates of federal government in the power business are not concerned with public welfare, as they profess to be, but with the achievement of political domination through control of the nation's electricity resources."

ROGER M. BLOUGH
*Chairman of the board, United
States Steel Corporation.*

"... a substantial part of our profits are not real profits in the sense that they can be used to pay dividends, or to provide for expansion and growth, or to serve any of the other functions that a profit is supposed to perform. They are what I would call phantom profits destined for replacement profits which are eaten up by inflation, almost before we get them. They cannot finance progress. We must use them just to stand still."

CRAMER W. LAPIERRE
*Executive vice president, General
Electric Company.*

"Technology is increasing at a more rapid rate than ever before. If we don't have too much interference we'll have progress. The great increase in population will require larger manufacturing and service plants, just to keep our present standard of living. Yet, nobody will be satisfied just to keep it as it is today. How are we going to finance this progress? The answer is through profits. Yet it seems to be good politics in this country to be against business and against profits. The public at large—the voters—are being led to believe that there is something bad about profits. We think that profits are the heart and the soul of our progress. If we don't have the profits, we are not going to have the progress."



Dispatchers of Northern States Power Company in Minneapolis have spinning picture of load conditions across the company's 40,000

square mile area. Bell System private line channels carry data fast and accurately from all over the system to the operations center.

How Bell System communications serve the power industry

Modern communications help Northern States make profitable use of a million-KW capacity

Bell System private line channels tie the power networks serving homes and industries in 527 upper Mid-west communities to the new system operations center of Northern States Power Company in Minneapolis.

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PRIVATE LINE TELEPHONE • PRIVATE LINE TELETYPEWRITER
CHANNELS FOR: DATA TRANSMISSION • TELEMETERING
REMOTE CONTROL • TELEPHOTOGRAPH • CLOSED CIRCUIT TV

A question for every electric utility

JUST HOW FLEXIBLE CAN POWER SUPPLY GET?

Giant strides to improve flexibility of supply to customers have been taken in recent decades by the electric utility industry. Today power availability must anticipate load growth more than ever before. Inter-connected supply permits transfer of power from one area to another as varying geographical load demands or emergency situations arise.

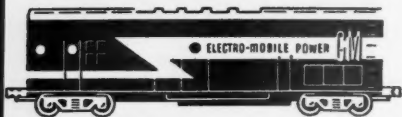
Even greater flexibility, however, can be attained—by means of Electro-Mobile Power. Truck-trailer or rail units permit shifting increments of power from place to place as demands change. Units can be used singly or in multiple—added like building blocks to match requirements exactly. And provision for impulse starting and stopping allows unattended operation

from any location in the system.

Moreover, the placement of Electro-Mobile Power close to the load not only relieves the central station of a block of power, but also reduces the line loss between the central station and the load for that block of power. This is a major factor at time of peak.

Just how flexible can service get? Far more flexible than you might imagine with present equipment if Electro-Mobile Power is employed to answer additional requirements. A joint analysis of your system can reveal the savings and increased flexibility possible with these units. Contact your Electro-Motive representative for full information.

Electro-Mobile Power adds to system flexibility in many ways



RAIL CAR—1000 kw units for use on sidings or placed on piers for semi-permanent use.

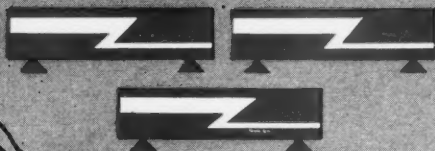


TRUCK TRAILER—500 kw units offer excellent mobility for many temporary applications.

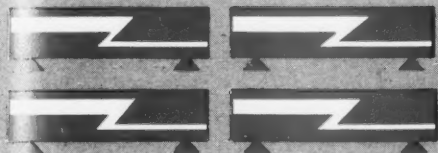
Representative electric utility companies across the country are now providing better service to customers through the use of Electro-Mobile Power. This diagram is a composite of the different jobs these units, both truck-trailer and rail, are performing. Detailed information on these applications—operating costs, KWH produced, reason for use, location, etc.—are available through your Electro-Motive representative.



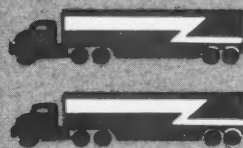
Rail units used for peaking.



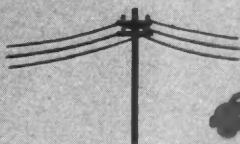
Rail units used for boosting.



Rail units used for temporary service during growth stage of new community. Units are added or subtracted until level is reached and permanent facilities can be erected in the most desirable location.



Mobile trailer units thrown into service during temporary outage caused by flood.

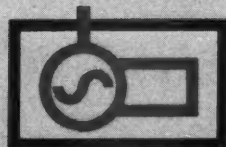


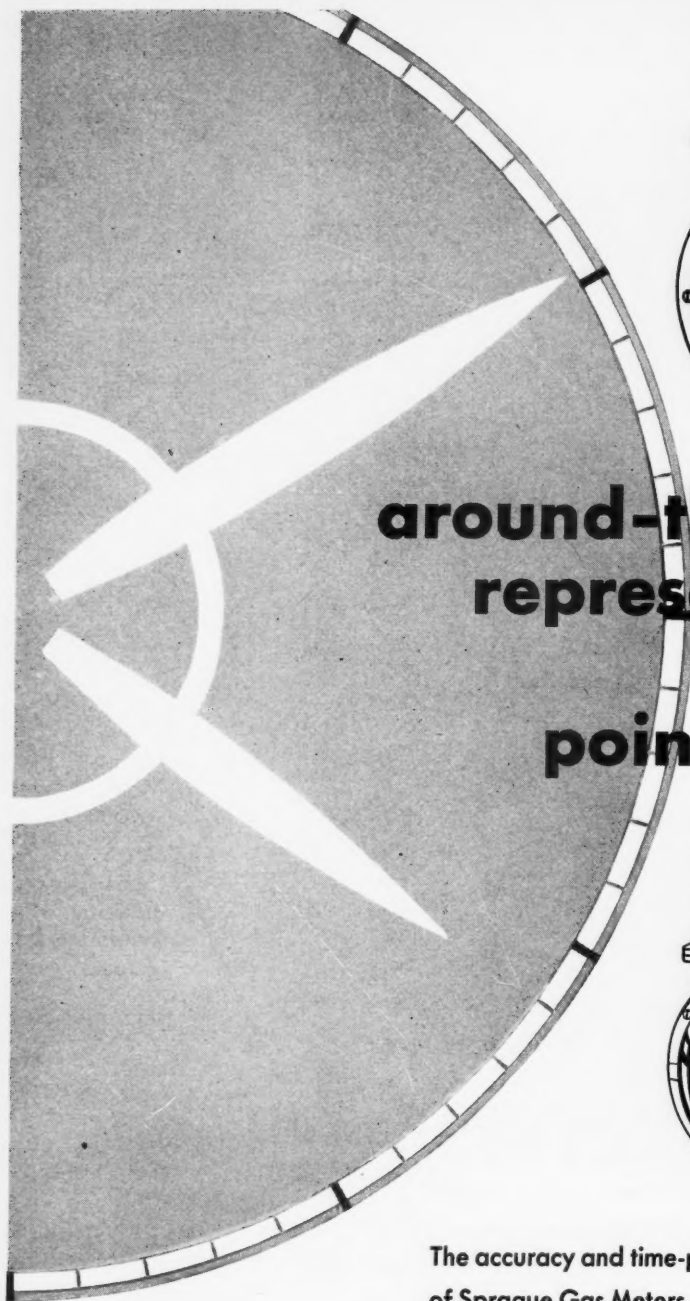
Mobile trailer units being used during line relocation resulting from new highway construction.

ELECTRO-MOTIVE DIVISION GENERAL MOTORS

LA GRANGE, ILLINOIS

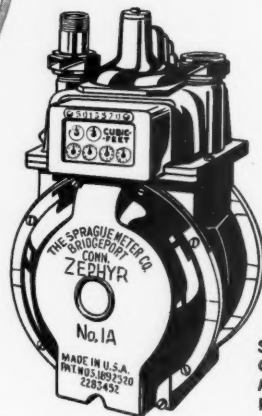
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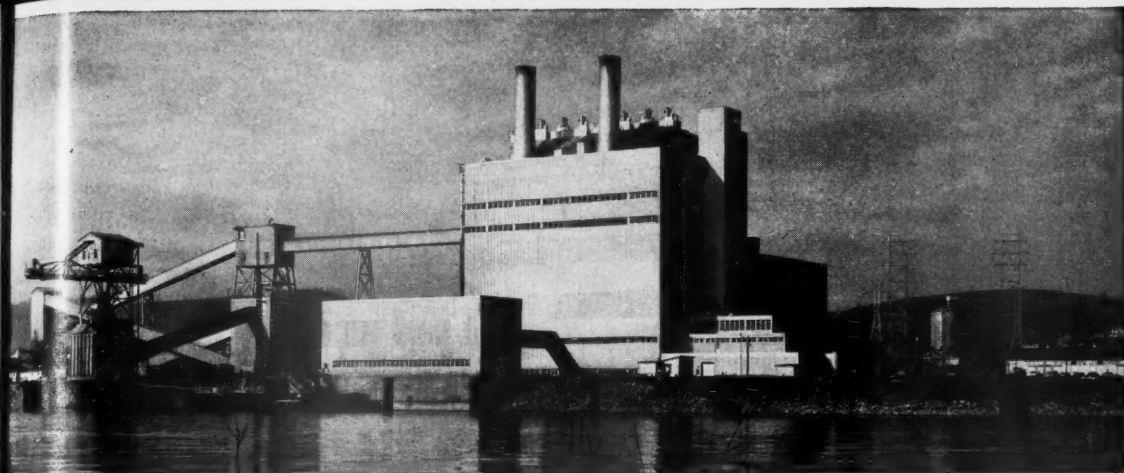
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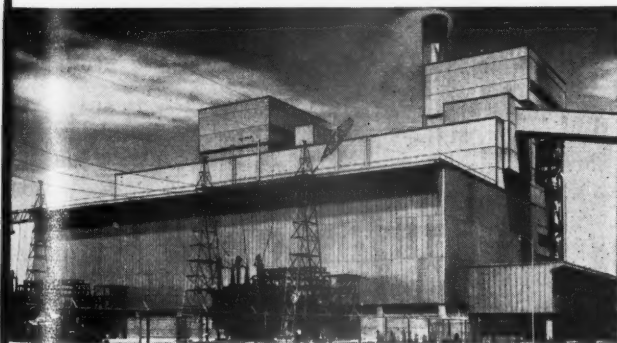
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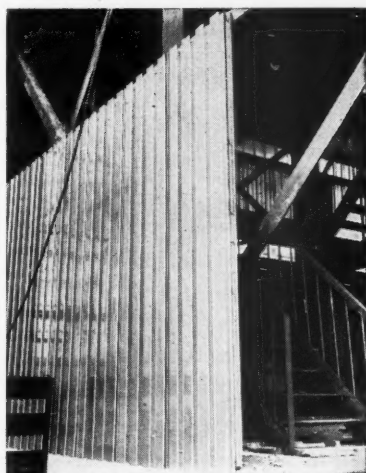
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Q-Panel walls grace the new Elrama Power Plant (above) near Pittsburgh. It was designed by Duquesne Light Company's Engineering and Construction Department. The Dravo Corporation was General Contractor.



Q-Panel walls (above) go up quickly in any weather because they are dry and hung in place, not piled up.

More than 32,000 sq. ft. of Q-Panels were used to enclose the impressive Hawthorn Steam Electric Station (left) of the Kansas City, Missouri, Power and Light Company. Ebasco Services, Inc., designed and built the plant.



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Now . . . most power of the low-priced 3 New **DODGE** ***PowerGiants***

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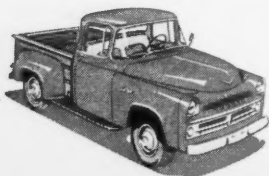
Extra handling ease. Exclusive push-button automatic transmission*! Sharpest turning and easiest steering in the industry!

See the new *Power Giant* line-up now at your Dodge dealer's. You'll see features that prove it pays to get your Dodge dealer's deal before you decide on *any* truck.

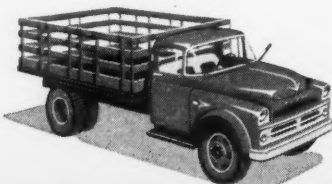
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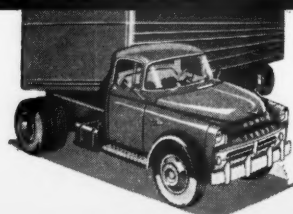
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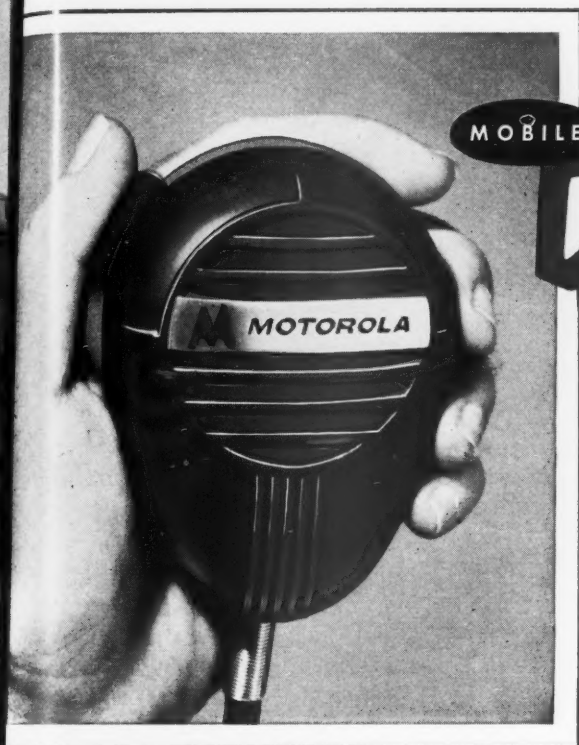


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400	15,000 lbs.	26,000 lbs.	197
500	18,000 lbs.	32,000 lbs.	197
600	21,000 lbs.	35,000 lbs.	197
700	23,000 lbs.	45,000 lbs.	216
800	25,000 lbs.	55,000 lbs.	222
900	30,000 lbs.	65,000 lbs.	232
Forward-Control Models			
P300	9,000 lbs.	—	204
P500	15,000 lbs.	—	204
C.O.E. Models			
C500	18,000 lbs.	32,000 lbs.	197
C600	21,000 lbs.	35,000 lbs.	197
C700	22,500 lbs.	45,000 lbs.	216
Tandem Models			
T700	32,000 lbs.	45,000 lbs.	216
T800	36,000 lbs.	55,000 lbs.	222
T900	46,000 lbs.	65,000 lbs.	232

important new "PLUS FACTOR" of the Motorola Twin-V Radiophone



TRANSISTORIZED DYNAMIC MICROPHONE

Unprecedented voice clarity
for mobile radio transmission

- true moving coil dynamic characteristics
- transistor preamplifier built-in
- printed circuit
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- retains popular size and shape
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- unexcelled reliability.



The new transistorized dynamic microphone, or the dual purpose dynamic "Speaker-Mike," is *optionally* available with Motorola's "TWIN-V" Radiophone—the world's finest FM 2-way mobile radio unit . . . incorporating many *exclusive* features, including universal 6/12 volt operation, Sensicon receiver, Permaky Filter, and Instantaneous Deviation Control.

Motorola's new transistorized dynamic microphone provides *mobile* transmission quality comparable to that of the base station. Unexcelled voice clarity, crispness, and intelligibility are yours in this newest Motorola *first*.

Also available as "SPEAKER-MIKE"

The new microphone can be furnished as a dual-purpose "Speaker-Mike" which functions as a full output communications-type *loudspeaker*, as well as a dynamic microphone. It can be conveniently mounted, or held near the operator's ear to overcome high ambient noise levels.



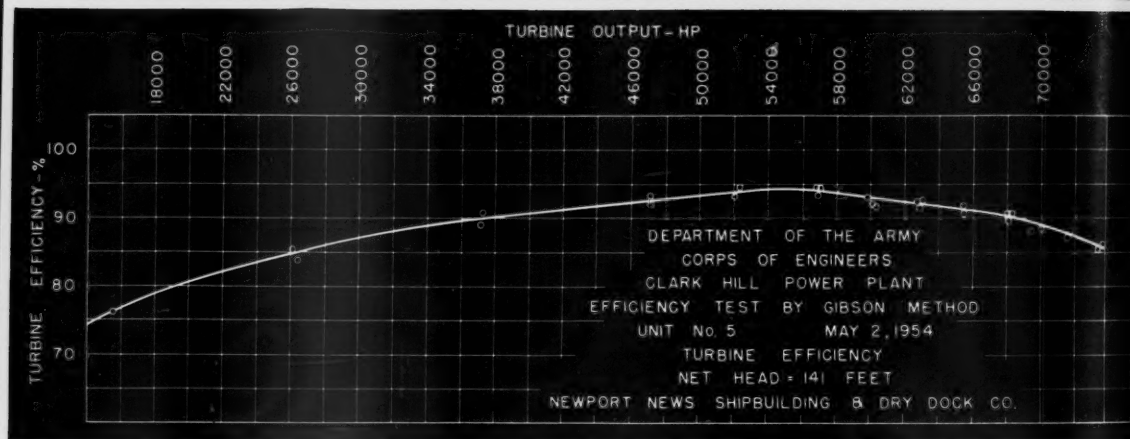
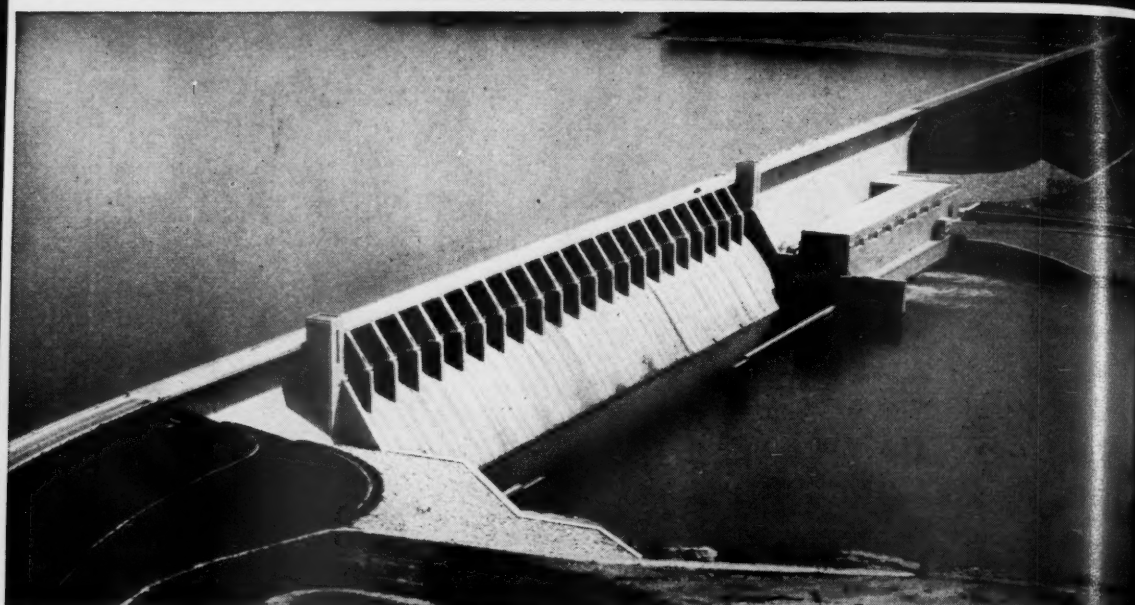
You can have either of these outstanding microphones as replacement items, or as *optional* equipment with new Motorola "TWIN-V" Radiophones. The transistorized, dynamic microphone, with its *popular palm size*, is directly interchangeable with Motorola carbon models now in use. The "Speaker-Mike" version requires a simple modification kit for replacement use in existing equipment.

Immediately available. Write, phone or wire today, or contact your local Motorola Radio Communications Engineer.

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 COMMUNICATIONS & ELECTRONICS, INC.

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Maximum efficiency of 94.1%

Reflects advanced practices at Newport News

THE GRAPH shows performance of a 55,000 horsepower turbine, one of seven such units built by Newport News for the Clark Hill Power Plant (see photo).

Shape of the curve is typical ... not exceptional ... for Newport News turbine performance. Regular, uniform, showing no-cut-off at full load, it indicates consistent delivery and stable operation.

And especially, experience in design and model testing.

At Newport News, turbine runners are continually being designed and redesigned for improvements in

performance. And often upon receiving a contract for turbines, a model setting is built and complete tests made. So far, Newport News has filled turbine contracts with an aggregate rated output in excess of 7,000,000 horsepower.

Penstocks, spiral casings, valves, pumps, rack rakes and other essentials are also designed and built by Newport News. Our illustrated booklet, "WATER POWER EQUIPMENT," will be sent to you upon request.

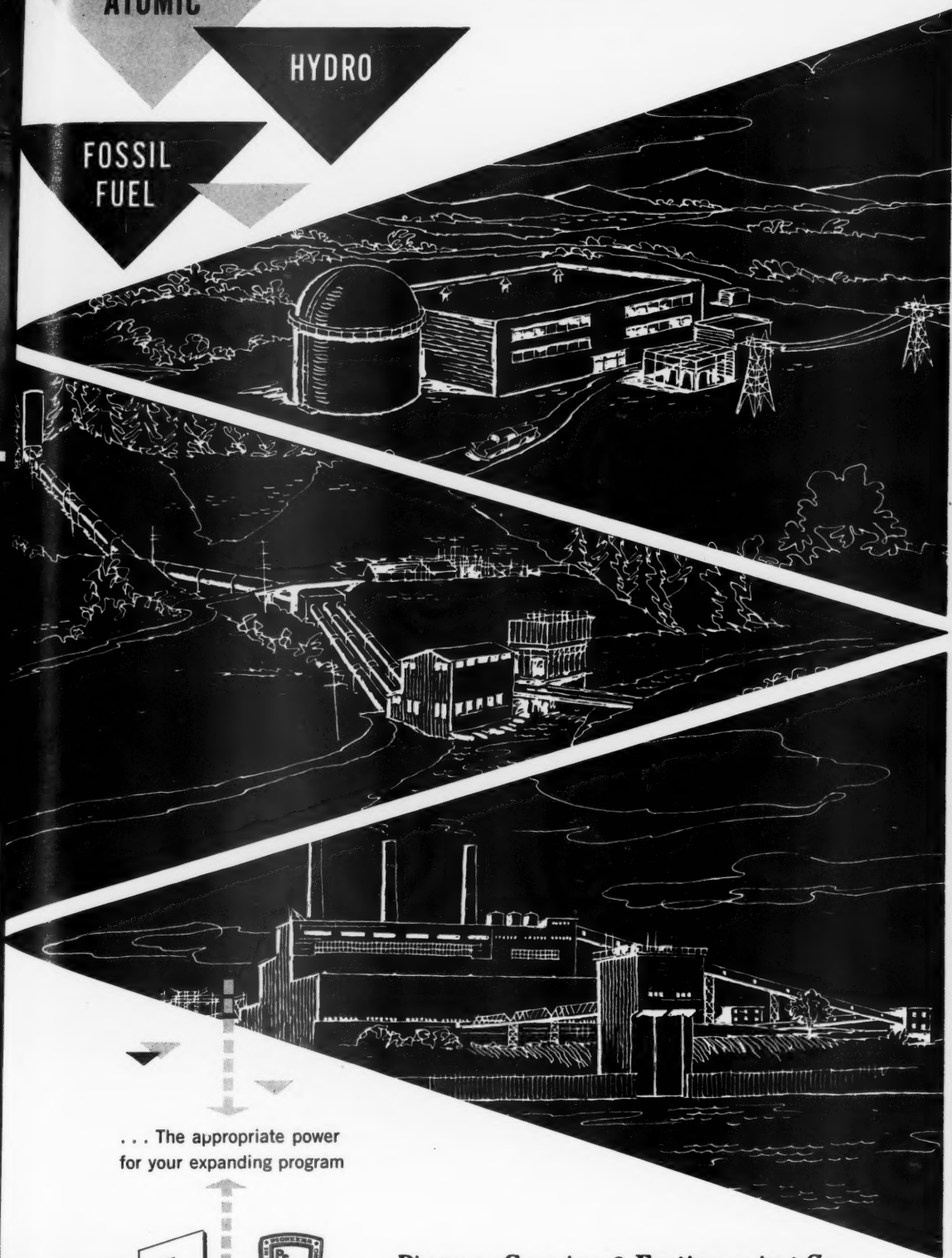
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BEST BURNER BIG BOILERS

...C-E Tilting, Tangential Burner

Nearly 450 C-E Boilers with an aggregate capacity well over 200-million pounds of steam per hour are now in service proving the advantages of firing with C-E Tangential Burners. And another 125 units are under construction or on order. The more important of these advantages are:

BETTER COMBUSTION

Tangential firing is fundamentally the best method of firing any fuel — coal, oil or gas — particularly in big furnaces. Here's why:

1. The extreme turbulence created by impinging flame streams of adjacent burners assures the most effective mixing of all the air with all of the fuel to produce the most rapid and complete combustion.
2. The swirling, rotating travel of combustion gases fills the furnace cross-section and utilizes the heat absorbing wall surfaces most effectively.

SUPERHEAT CONTROL

Virtually all tangential burners in large C-E utility boilers are of the vertically adjustable (tilting) design. This feature provides, in addition to the exceptional combustion efficiency inherent in tangential firing, a degree of superheat temperature control which cannot be achieved with any other firing method. Here's how:

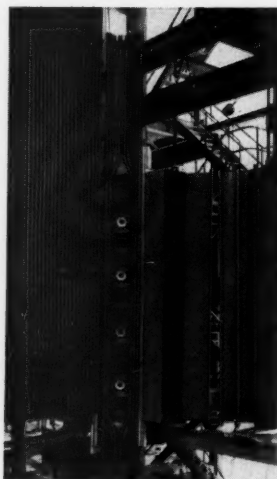
1. If steam temperature goes too high, the C-E Tilting, Tangential Burner nozzles automatically tilt downward. More furnace wall surface becomes effective. Gas temperature to superheater surface is lowered. Steam temperature comes down.
2. Conversely, if steam temperature drops below that efficient for the turbine, nozzles tilt upward, sending hotter gases to the superheater. Steam temperature goes up — automatically.

As a result, the minimum gas temperature necessary to assure proper superheat is maintained. There is no need for desuperheating . . . minimum use of

spray water . . . less chance of fouling turbine blades. Turbine availability is higher . . . efficiency is maintained.

In the most important areas of performance, therefore, the tangentially fired unit has established itself *in service* over a period of many years as the best method of firing for big boilers. More recently it met similar success in smaller oil and gas fired units for capacities as low as 50,000 lbs of steam per hour.

A new catalog, PC 8, gives many more details. May we send you a copy?



C-E Tangential Burners are now shop assembled with adjacent furnace tubes in place. The illustrations below and at left clearly indicate the resulting advantages in transportation, handling and installation.

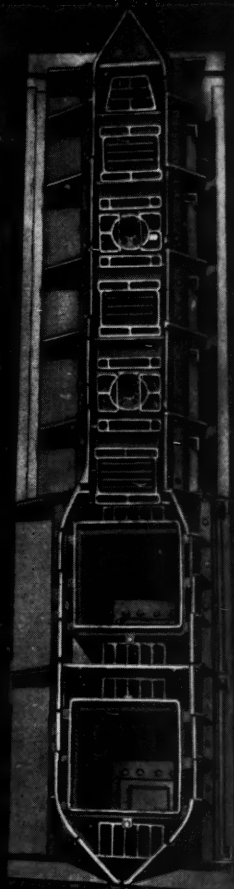


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▲ The versatility of the tangential burner is well illustrated by this rather special design, made for a wide variety of fuels. This burner has nozzles for coal, oil, coke oven gas and — at the bottom — blast furnace gas. The latter is stationary—the rest are adjustable.

◀ This view of the firing floor of a large tangentially fired C-E utility boiler shows the clean-cut, uncluttered appearance which is typical of units of this type.

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Preparing for the Utility Rate Case

by Francis X. Welch,
B. Litt., LL. B., LL. M.



320 pages
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AMONG the values of this compilation of experiences taken from the records of actual rate cases, are the reviews of methods and procedures, which have been found helpful in —

- ▶ simplifying and speeding up rate case groundwork
- ▶ saving time and expense of participants
- ▶ cutting down "lag losses"
- ▶ increasing the confidence of investors

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Proof of the Rate Base
The Completed Rate Base—Overheads, Land, Depreciation, Working Capital
Completing the Rate Base; Working Capital
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- ▶ filing the application
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In fact, it explains the time-saving and effective ways of making the step-by-step progress toward the rate decision, including information concerning the requirements for appeal and review.

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Setting and Opening The Hearing
Examination In Chief
Cross-Examination and Rebuttal
Evidence in a Rate Case
The Case for Complainants or Rate Increase Protestants
The Expert Witness
Motions, Interlocutory Procedures, Arguments, Briefs and Decisions
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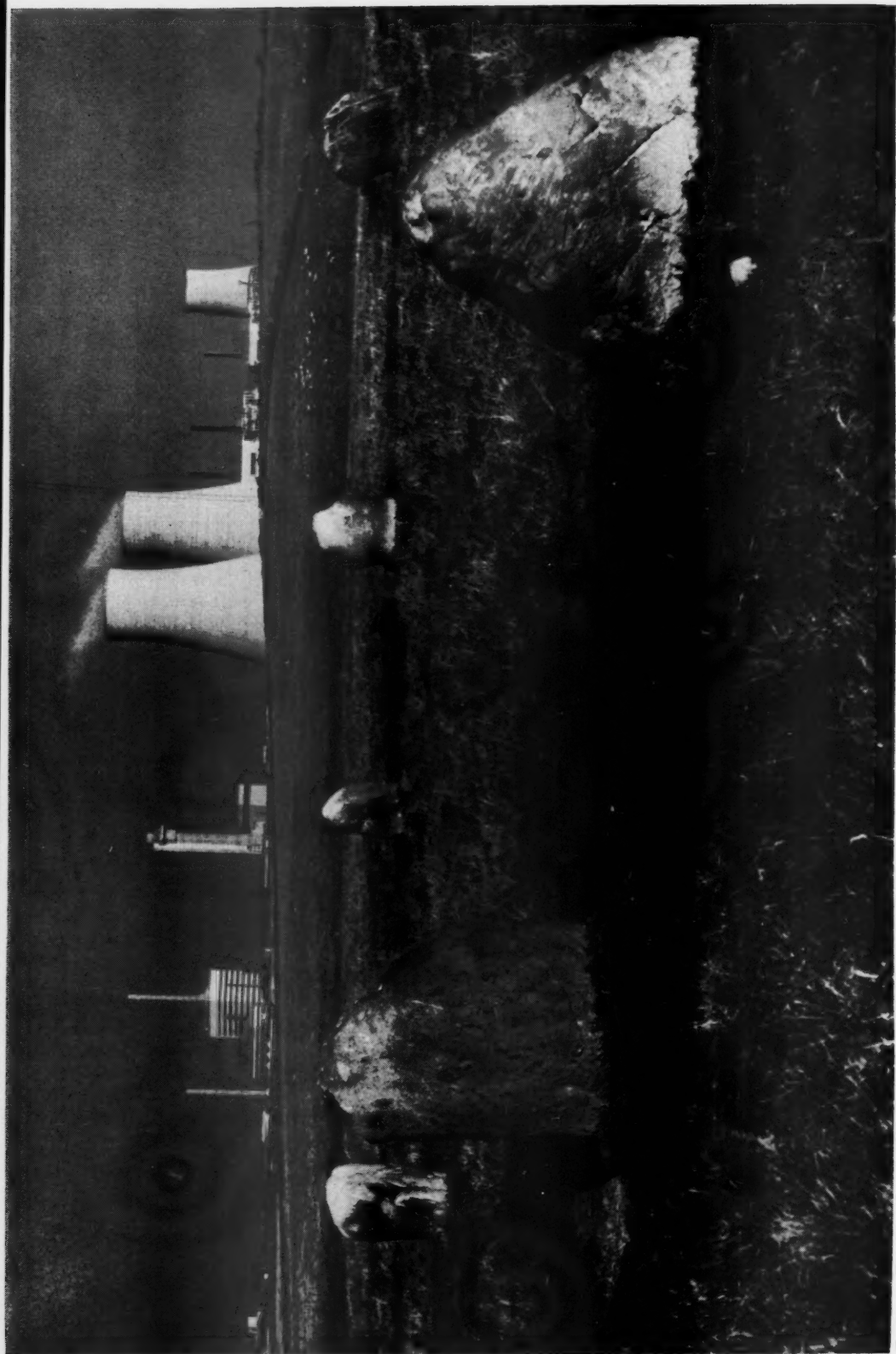
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UTILITIES

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FEBRUARY-MARCH

Thursday—14 <i>American Water Works Association, New Jersey Section, holds winter luncheon, Newark, N. J.</i> 	Friday—15 <i>National Society of Professional Engineers begins spring meeting, Charleston, S. C.</i>	Saturday—16 <i>Kentucky Independent Telephone Association will hold annual convention, Lexington, Ky. Mar. 5. Advance notice.</i>	Sunday—17 <i>Annual Conference on High-speed Computers will be held, Louisiana State University, Baton Rouge, La. Mar. 5-8. Advance notice.</i>
Monday—18 <i>Minnesota Telephone Association, Inc., begins annual convention, Minneapolis, Minn.</i>	Tuesday—19 <i>National Association of Corrosion Engineers will hold meeting, St. Louis, Mo. Mar. 11-15. Advance notice.</i>	Wednesday—20 <i>New England Gas Association will hold annual meeting, Boston, Mass. Mar. 21, 22. Advance notice.</i>	Thursday—21 <i>Southern Gas Association begins sales executives' conference, New Orleans, La.</i> 
Friday—22 <i>National Adequate Wiring Conference ends 2-day annual discussion, Chicago, Ill.</i>	Saturday—23 <i>Mid-West Gas Association will hold meeting, Minneapolis, Minn. Mar. 25-27. Advance notice.</i>	Sunday—24 <i>North Central Electrical League begins annual upper midwest electrical industry convention, Minneapolis, Minn.</i>	Monday—25 <i>American Society of Heating and Air-conditioning Engineers begins annual meeting, Chicago, Ill.</i>
Tuesday—26 <i>Institute of Radio Engineers begins western joint computer conference, Los Angeles, Cal.</i>	Wednesday—27 <i>Electrical Equipment Representatives Association begins annual meeting, San Antonio, Tex.</i>	Thursday—28 <i>Louisiana Telephone Association ends 2-day annual convention, Shreveport, La.</i>	MARCH Friday—1 <i>Pacific Coast Electrical Association, Business Development Section, ends 2-day meeting, San Francisco, Cal.</i> 



Courtesy, The Manchester Guardian

From History's Dawn to the New Era of Man
A four-thousand-year-old druidic circle contrasts with the towers of England's Calder Hall atomic plant.

Public Utilities

FORTNIGHTLY

VOL. 59, No. 4



FEBRUARY 14, 1957

A Partnership Plan for Atomic Power Development

Co-operation between government and industry rather than rivalry or discrimination is the only sensible key to American supremacy and success in the field of atomic energy development.

By ROBB M. WINSBOROUGH*

WISELY or unwisely, the impression has been created at home and overseas that construction of lots of big nuclear-powered electric-generating plants will bring about a fast trip, at least halfway to the millennium.

The hope has been held out to underdeveloped countries that nuclear power offers a quick way to attain living standards comparable to the West's and, more

particularly, to those of the United States.

Early in 1956, as part of the "Atoms for Peace" program and to raise living standards, President Eisenhower made available for nuclear power plants abroad 44,000 pounds of fissionable uranium valued at about \$500 million. (Roughly \$11,000 a pound.)

There have been few cautious voices. Hopeful assumptions have been made that — somehow — building a nuclear power plant will work a miracle and riches

* Consultant, Middle West Service Company, Chicago, Illinois. For additional personal note, see "Pages with the Editors."

PUBLIC UTILITIES FORTNIGHTLY

will flow from it as from the horn of plenty. Little has been said publicly about existing cultural and economic traditions and patterns that may resist industrialization. Nor has much attention been directed toward possible scarcity of local capital for investment, or lack of industrially skilled labor or undeveloped and inadequate markets.

Neither have the sociologists spoken up to point out what might happen in an already overpopulated area under the stimulus to population increase which usually has accompanied industrialization.

IN a very human way these questions and problems became invisible in the bright light of hope for the nuclear millennium.

At home something very akin to this has also been happening. Enthusiastic talk has been heard about unlimited free electricity when atomic power arrived. There would be no more electric bills and the deserts would bloom under cost-free irrigation.

But the millennium proves stubborn. It is slow in coming. The cold war has persisted. The light and power companies still send out bills for electricity. Irrigation still costs money.

Something must be wrong. Somebody must be gumming up the works.

With so many miracles promised it is easy to understand the impatience which broke out in Congress and in the 1956 presidential campaign. The two Democratic standard-bearers charged in various speeches that the United States was lagging behind other nations in peacetime atomic development. At Seattle, Adlai Stevenson said the reason was that Washington had "abdicated its major responsi-

bility" in this field to private industry. The Atomic Energy Commission and the electric light and power companies were charged with an atomic fizzle.

SENATOR Albert Gore, Democrat of Tennessee and staunch supporter of TVA and government in the power business, introduced a bill which directed the Atomic Energy Commission to build six large-size nuclear electric-generating plants in different geographic sections of the country. They were to be built at AEC installations, for production of electric power in commercially useful quantities, to be used by AEC. The bill authorized \$400 million for this purpose. The Senate passed the bill but the House turned it down by a narrow margin.

Hearings on the bill were held by the Joint Committee on Atomic Energy. Dozens of witnesses were heard. Supporters of the Gore Bill generally charged that: (1) The bill was needed to maintain America's atomic world leadership; that we were losing the kilowatt race to foreign countries that were making more rapid progress in nuclear power development than the U. S.; (2) the U. S. reactor program was too limited in scope; (3) the electric industry talked about nuclear power but did not do anything and there was no guaranty industry promises would ever be fulfilled; (4) the U. S. needed an "atomic yardstick" like the "TVA yardstick"; (5) the government should build the big commercial plants because it had built the small experimental power reactors.

THE Atomic Energy Commission opposed the Gore program. Chairman Strauss testified that the commission be-

A PARTNERSHIP PLAN FOR ATOMIC POWER DEVELOPMENT

lieved emphasis of governmental research and development work should be on the earlier stages of design, feasibility, and experiment, whereas emphasis of private industrial effort should be on construction of prototypes and their operation.

WHEN the Gore Bill died in the House, it also killed a proposed amendment to the Atomic Energy Act which would have provided governmental indemnity and granted limitation of liability for persons in the atomic energy program. This amendment would, in effect, have provided excess insurance above the amount which can be bought from insurance companies for public liability of corporations operating nuclear energy electric power stations. The amendment was greatly sought by companies now building nuclear electric power plants. Its passage was also recommended by the congressional Joint Committee on Atomic Energy and agreed to by the Atomic Energy Commission. When the Gore Bill died, this amendment was not brought out of the committee.

Section 202 of the Atomic Energy Act of 1954 requires that within the first sixty days of the new Congress the Joint Committee on Atomic Energy shall conduct hearings for the purpose of receiving information concerning the development,

growth, and state of the atomic energy industry.

THE issues of the 1956 session are certain to come up again and these hearings will provide a forum for airing the differences of opinion and the clash of viewpoints so apparent last year.

Representative Melvin Price, Democrat of Illinois, member of the congressional Joint Committee on Atomic Energy, in a speech at the Atomic Industrial Forum in Chicago in September, promised to introduce into the 1957 Congress a combination bill containing the indemnity provisions as Title I and the substance of the Gore Bill as Title II. This will revive the government ownership *versus* private ownership issue.

The charges and countercharges are certain to be confusing, unless one reviews the record of what has been done and puts the issues into proper perspective. Then one can see more clearly the realities which underlie the controversy. One can better form a considered judgment as to the choice of courses of action and select one that best safeguards and advances the long-time interests of all the people of the United States.

What does the record show? What are the relevant facts? What is the course of



Q "HOPEFUL assumptions have been made that—somehow—building a nuclear power plant will work a miracle and riches will flow from it as from the horn of plenty. Little has been said publicly about existing cultural and economic traditions and patterns that may resist industrialization. Nor has much attention been directed toward possible scarcity of local capital for investment, or lack of industrially skilled labor or undeveloped and inadequate markets."

TABLE I
NUCLEAR ELECTRIC POWER-GENERATING STATIONS IN THE UNITED STATES
PLANNED, UNDER DEVELOPMENT, OR UNDER CONSTRUCTION
AS OF DECEMBER 31, 1956¹⁰

No.	Expected Operating Date	Kilowatts Electric Capacity	Name of Organization	Type of Reactor	Location	Cost to Organization	Contribution By AEC	Total Cost
1	1957	60,000 ⁵	Duquesne Light Co.—AEC— Westinghouse	Pressurized Water	Shippingport, Pa.	\$ 15,000,000 ⁸	\$ 91,850,000 ⁷	\$106,850,000
2	1957	7,500	Southern California Edison—AEC	Sodium Graphite	Santa Susanna, Cal.	1,000,000 ⁸	12,500,000	13,500,000
3	1957	5,000	North American Aviation	Boiling Water Prototype for Dresden, Ill., Plant	Livermore, Cal.	600,000 ²	0	600,000
4	1959	500	Pacific Gas & Electric Co.— General Electric	Pressurized Water	Gainesville, Fla.	1,300,000	850,000	2,150,000
5	1959	10,000	University of Florida	Aqueous Homogeneous	Hersey, Mich.	1,088,000	3,788,000	4,876,000
6	1960	236,000	Wolverine Electric Cooperative Consolidated Edison Co. of N. Y.	Pressurized Water Thorium-Uranium Converter	Indian Pt., N. Y. Buchanan	55,000,000	0	55,000,000
7	1960	100,000	Power Reactor Development Co.— The Detroit Edison Co. (A)	Fast Neutron Breeder Sodium Cooled	Monroe, Mich.	54,000,000	4,450,000 ⁴	58,450,000
8	1960	134,000	Yankee Atomic Electric Co. (B)	Pressurized Water Steel Clad Uranium Oxide Fuel Elements	Rowe, Mass.	34,500,000	5,000,000 ⁴	39,500,000
9	1960	75,000	Consumers Public Power District of Nebraska	Sodium Graphite Boiling Water	Beatrice, Neb.	16,020,000	10,480,000	26,500,000
10	1960	22,000	Rural Co-operative Power Assn.	Organic Moderated (Diphenyl)	Elk River, Minn.	2,425,000	6,860,000	9,285,000
11	1960	12,500	City of Piqua, Ohio	Dual Cycle, Boiling Water	Piqua, Ohio	1,960,000	5,340,000	7,300,000
12	1961	180,000	Commonwealth Edison Co.	Liquid Metal Fueled	Dresden, Grundy Co., Ill.	45,000,000	0	45,000,000
13	1961	25,000 (—40,000)	Nuclear Power Group (C) City of Orlando, Florida		Orlando, Fla.	11,100,000	19,050,000	30,150,000
14	1961	15,000	City of Holyoke, Mass.	Closed Cycle, Gas Cooled (Nitrogen)	Holyoke, Mass.	4,028,000	6,100,000	10,128,000
15	1962	150,000	Pennsylvania Power & Light Co.	Aqueous Homogeneous	Central Eastern Pennsylvania	42,000,000 ¹	0	42,000,000
16	1962	200,000	Florida Nuclear Power Group (D)	Not Yet Selected	Florida	50,000,000	0	50,000,000
17	1962	10,000	Chugach Electric Assn.	Heavy Water Moderated	Anchorage, Alaska	1,875,000	14,975,000	16,850,000
18	8	8	Carolinas-Virginia Nuclear Power Associates ³ (E)	Sodium Cooled	8	56,000,000 ¹	8	56,000,000
19	1964	200,000	New England Electric System	8	9	9	9	9
20	9	20,000	Middle South Utilities (F)	9	9	9	9	9
Total		1,462,500				\$392,896,000	\$181,243,000	\$574,139,000

A PARTNERSHIP PLAN FOR ATOMIC DEVELOPMENT

¹ Computed at \$280 per kilowatt installed.

² For turbogenerator portion. General Electric Company to build reactor.

³ Details of plant not yet announced.

⁴ For research and development work only.

⁵ Initial capacity. Ultimate of 100,000 kilowatts expected.

⁶ Includes 10 million for turbogenerator portion and 5 million toward cost of reactor. Westinghouse Corp. is contributing \$500,000 toward the cost of the reactor.

⁷ Includes \$59.6 million research and development costs.

⁸ For turbogenerator portion. North American Aviation building reactor for AEC and contributing \$2,850,000 toward project.

⁹ Middle South Utilities has advised AEC that the company has asked four prominent nuclear engineering organizations each to identify to Middle South, with preliminary estimates of construction costs, a conceptual design of a reactor which would contribute importantly to the advancement of reactor technology if built in prototype size of around 20,000 kilowatts and would hold promise, if later built in larger size, of ultimately providing an economically feasible source of energy to supplement conventional fuels in the operating companies' service area.

¹⁰ Source of data: Hearings before subcommittee of the Committee on Appropriations, House of Representatives, 84th Congress, 2nd Session, Part 2; Investigation of Atomic Electric Power, pp. 98, 99, 116 and Press Release of Atomic Energy Commission "Reactors Built, Building, or Planned in the United States as of October 1, 1956," *Washington Post*, August 1, 1956, pp. 3033; *Electrical World*, McGraw-Hill, May 28, 1956, pp. 127-130; and public announcements by New England Electric System and Middle South Utilities.

(A) Power Reactor Development Company:

Alabama Power Company
Central Hudson Gas & Electric Corporation
Cincinnati Gas & Electric Company
Columbus & Southern Ohio Electric Co.
Consumers Power Company
Delaware Power & Light Co.
Detroit Edison Company
Georgia Power Company
Gulf Power Company
Iowa-Illinois Gas & Electric Company
Long Island Lighting Company
Mississippi Power Company
Philadelphia Electric Company
Potomac Electric Power Company
Rochester Gas & Electric Corporation
The Southern Company
Tulsa Electric Company
Wisconsin Electric Power Company

(B) Yankee Atomic Electric Company:

Boston Edison Company
Central Maine Power Company
Central Vermont Public Service Corp.
Connecticut Light & Power Company
Connecticut Power Company
Pacific Electric Light Company
Public Service Company of New Hampshire
Western Massachusetts Electric Co.
Subsidiary of New England Electric System

(C) Nuclear Power Group:

American Gas & Electric Service Corp.
Commonwealth Edison Company
Central Illinois Light Company
Illinois Power Co.
Kansas City Power & Light Company
Pacific Gas and Electric Company
Union Electric Company

(D) Florida Nuclear Power Group:

Florida Power Corporation
Florida Power & Light Company
Tampa Electric Company

(E) Carolinas-Virginia Nuclear Power Associates:

Carolina Power & Light Company
Duke Power Company
South Carolina Electric & Gas Co.
Virginia Electric & Power Company

(F) Middle South Utilities:

Arkansas Power & Light Company
Louisiana Power & Light Company
Mississippi Power & Light Company
New Orleans Public Service Company

New England Power Company Subsidiaries of New England Gas & Electric Assn.

Cambridge Electric Light Company
New Bedford Gas & Edison Light Co.
Affiliate of Eastern Utilities Associates
Montaup Electric Company

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action best calculated to protect and advance the welfare of the United States, and of the world? Let us try to find answers to these questions.

From the inception of the atomic bomb idea in 1939 until August, 1954, the use of atomic energy was an absolute government monopoly in the United States.

IN 1954 Congress decided the time had come to allow private industry to go ahead with development of commercial nuclear electric power. The 1946 (McMahon) Atomic Energy Act was revised and the new act became the Atomic Energy Act of 1954. Section 1 of that act declares it to be the policy of the United States that the development, use, and control of atomic energy shall be directed so as to:

- a. Make the maximum contribution to the general welfare, subject at all times to the paramount objective of making the maximum contribution to the common defense and security; and
- b. Promote world peace, improve the general welfare, increase the standard of living, and strengthen free competition in private enterprise.

This 1954 act, for the first time, granted private industry permission to engage in development and construction of its own nuclear electric power plants, under license from AEC, and with the title to all fissionable materials remaining with the United States government through AEC.

In 1953, before the act was revised, AEC had launched a five-year power reactor development program costing \$199 million. It called for construction of five

types of reactors which were thought to have sufficient possibilities to warrant construction. They were: (1) boiling water, (2) pressurized water, (3) sodium graphite, (4) aqueous homogeneous, (5) fast-breeder. About the same time, AEC authorized the first full-scale nuclear electric power plant, a pressurized water reactor to produce 60,000 kilowatts of electric power. It was to be constructed by Westinghouse Electric Corporation and The Duquesne Light Company was to supply electrical generating equipment at its own expense.

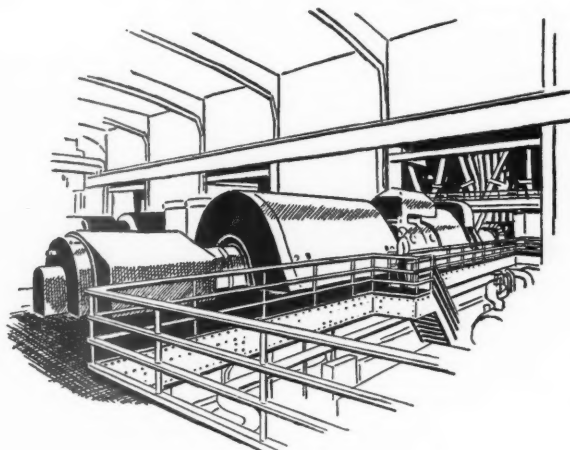
IN January, 1955, AEC announced a new power demonstration reactor program, for full-size nuclear electric-generating plants. AEC offered developmental assistance, use of AEC laboratories, and fuel price waiver for seven years to groups that would build nuclear electric power plants. In September of 1956 AEC issued a second invitation under this plan, this time for proposals to develop, design, construct, and operate small power reactors.

At the close of 1956, as a result of the AEC and industry activity, 20 nuclear electric power plants were in various stages of planning, development, and construction in the United States and Alaska.

They will have an initial generating capacity of more than 1,462,500 kilowatts. That much has been publicly announced and the size of one of the plants had not yet been released at the year end.

These nuclear electric-generating plants will represent a total investment of more than \$574 million. Electric light and power companies will invest approximately \$350 million of their own funds to build 12 of these 20 plants. The AEC will contribute about \$180 million toward

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The Lead in the Atomic Power Race

“EVERYONE concedes the desirability of maintaining our lead in nuclear technology. This means we must have a continuing, vigorous, and large-scale research and development program aimed toward new techniques, methods, and possible discoveries. This is one of the important and proper functions of AEC and Chairman Strauss has repeatedly so stated. Sound economical development of nuclear electric power is more likely to occur if nuclear power is not made a vehicle for advancing the cause of government ownership.”

the cost of all 20. Three municipalities, three co-operatives, one university, and one public power district will spend a total of about \$40 million on eight of them.

The electric-generating capacity from these nuclear power stations is expected to come into production as follows:

1957	.....	72,500	kilowatts
1959	.....	10,500	"
1960	.....	579,500	"
1961	.....	220,000	"
1962	.....	360,000	"
1964	.....	200,000	"
?	.....	20,000	"
		1,462,500	kilowatts

The 20,000 kilowatts shown with an uncertain date beyond 1964 are for a prototype plant still in the study stage.

THE 12 electric company generating stations will have a capacity of 1,292,500 kilowatts plus the size of the unannounced station. The other eight plants will have initial capacity of 170,000 and this will probably be raised to about 185,000 before completion.

Table I (pages 220, 221) shows expected completion dates, size, name of organization, cost to organization, cost to

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AEC, and total cost of all of these 20 nuclear electric-generating stations, so far as the data have been publicly released.

It takes three to four years to build a conventional electric-generating station where all the engineering is already well-known. It takes about four years to get a new jet fighter from the drawing board to the production line. It is six to nine years from the design stage to the first flight of a new jet heavy bombing plane.

THE record of the AEC, the electric light and power companies, and the equipment manufacturers in getting new nuclear electric-generating plants going so fast is a very creditable record. They all deserve public commendation for their accomplishments. Look at them quickly:

1. In December, 1951, the first electric power (100 kilowatts) was generated at the Argonne National Laboratory, near Chicago. The heat was supplied by the AEC experimental breeder reactor under the direction of Dr. W. H. Zinn, then director of Argonne. This was two and one-half years before the Russians announced their 5,000-kilowatt Moscow nuclear electric-generating station.

2. In 1953 the prototype for the power plant of the submarine *Nautilus* went into operation at the AEC testing station at Arco, Idaho. In 1954 the *Nautilus* was launched and has since cruised more than 50,000 miles without refueling. The second nuclear submarine is being tested now, the *Seawolf*.

3. In 1955, as a demonstration, the town of Arco, Idaho, received all of its electricity for lights from the nuclear power plant at the test station.

4. Electricity generated by nuclear energy at West Milton, New York, where General Electric has been building the submarine reactor for the *Seawolf*, has been feeding into the system of the light and power company serving that area and is being delivered to customers along with the conventional energy generated in the company's steam plants.

5. At least 20, and probably more, nuclear electric-generating plants will go into operation in the U. S. in the next eight years, as shown in Table I.

6. The uranium mining, refining, and processing industry has developed from virtually nothing in 1940 to an industry that in 1956 processed 3 million tons of ore into 6,000 tons of concentrate, containing 66,000 pounds of fissionable U-235.¹

UNFORTUNATELY, it seems unlikely that they will receive the credit they deserve. It appears more likely that they will be severely criticized and charged with dragging their feet and holding up progress. Last year they were charged with "losing the kilowatt race" to Russia and England and these charges are almost certain to be revived.

In reality, we have not lost the kilowatt race and no one's feet are dragging. Amazingly fast progress has been and is being made toward practical, reliable generation of electric power from nuclear energy. The progress is much faster and much more sure-footed than may appear from first glance at this complicated subject.

To get the issue into proper perspective and to appreciate what has been done and what needs to be done we must back away

¹ *Time*, December 24, 1956, pp. 54, 55.

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a little from the controversy and survey the simple fundamentals of generating electric power.

A short review makes a lot of things much clearer.

Generating electricity is a simple thing.

It only requires that we move a magnet near, into, or over a coil of wire. When we do that, we generate a current of electricity in the wire. That is all there is to it—in theory—and in actual practice on a small laboratory scale.

Electric-generating stations are built to do that simple job continuously on a big scale. The modern electric generator is a precision machine in which magnets can be spun at high speed inside of coils, or the other way around. The machines are big—some as big as half-a-million horsepower. They are rugged—built to give long, trouble-free life.

WE need some form of dependable and economical motive power to spin these generators. The three most widely used forms are the steam turbine, the water wheel (hydraulic turbine), and the internal combustion engine.

In the United States we generate more than three-fourths of all our electricity by using steam. The following comparison shows how we generated all of our elec-

tricity in the U. S. in 1955, a typical year:

Steam-generated electric power ..	78.6%
Hydroelectric power	20.7
Internal combustion power	0.7
Total U. S. electric power	100.0%

SINCE steam produces more than three-fourths of all our electricity, let's take a close look at a steam-driven electric-generating station.

What we have in a steam electric-generating station is, in effect, a big teakettle with a fire under it. The steam from the teakettle hits a fan mounted on a shaft carrying a magnet. Near the magnet is a coil of wire with an iron core running through it. The steam from the teakettle turns the fan, which spins the magnet. As the magnet spins, invisible lines of magnetic force cut across the turns of wire in the coil and an electric current is produced in the coil.

That is the way we generate electricity.

Where atomic energy comes in is that it gives us a new kind of fire to put under the teakettle. Heat from nuclear energy can take the place of whatever fuel we had been burning. Everything else stays practically the same.

The clamor to build atomic electric power plants boils down to a clamor to use a new kind of fire as a source of heat in generating electricity.



TABLE II

	Population	Electric Power Capacity (Total Kw) ²	Electric Power Capacity Per Person (Watts)
United States	165,248,000	130,414,000 Kw	789.2 watts per person
Rest of World	2,564,267,000	217,656,000 Kw	84.9 watts per person
World Total	2,729,515,000	348,070,000 Kw	127.5 watts per person

² World Power Data 1955, published by bureau of power, Federal Power Commission, Washington, D. C. August, 1956.

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THERE is no big change in the electric end of the generating station. A turbine can run on steam from any fuel, coal, oil, gas, atomic energy, or sawdust. A kilowatt-hour of electricity generated from atomic fuel has no special virtue. It is exactly the same as a kilowatt-hour generated by any of these other fuels, or by water power or diesel engines.

If the end product—kilowatts and kilowatt-hours—is the same with all kinds of fuel, in a free, competitive situation, the choice of fuel would ordinarily be decided by selecting the most economical and dependable fuel.

If atomic energy had been discovered at a quieter time in the world's history the decision to use it or not to use it as fuel in an electric power plant would have been decided upon that basis. Dependability and economy of operation have guided the United States electric light and power industry to its present position of pre-eminence in the world. Dependability and economy were the operating standards that brought alternating current in place of direct, the steam turbine to replace the reciprocating engine, and higher pressures and efficiencies that reduced the coal required to generate a kilowatt-hour from 20 pounds down to less than one pound.

As each new improvement was proposed, it was tried out by a company that needed, or could benefit from, the promised improvement. If the promised improvement proved itself, then use of the improvement spread and soon it became the industry standard. Attempted improvements that failed demonstrated their weaknesses quickly in a few places, at little total cost to the industry and at little inconvenience to the public.

Except for the intense domestic and international political pressures, that is what would happen to adoption of nuclear energy as a source of heat for electric power plants.

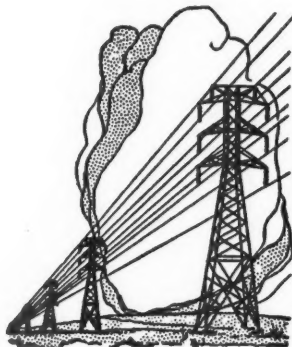
COMPANIES with high fuel costs would test nuclear reactors in an effort to reduce present operating costs. As companies tried them, improvements would be made. Succeeding reactors would be more efficient and more economical. These improved reactors could then compete with still cheaper fuel and the market for their use would expand.

Very quickly, probably within the 20- to 30-year normal life of generating equipment, nuclear reactors would spread to all or nearly all of the areas where over-all power costs from nuclear heat could compete with over-all generating costs from conventional fuels.

As conventional fuels became scarcer and more expensive, the area in which nuclear plants could compete would expand further. Ultimately, nuclear fuels might be the sole source of heat for electric power.

Whether this happened or not would be a matter of over-all competitive cost—the cheaper method being the one most likely to be used.

Freed of political pressure, that is about the way the electric industry would adopt nuclear energy as a source of heat for electric power generation. But nuclear energy is not free from political pressure and that is not the way the use of nuclear energy is going to be developed. Cold war pressures, the Atoms for Peace plan, and domestic political pressures seem conspiring to force us into a nuclear kilowatt race.



Atomic Fission Is a Fuel

"THE clamor to build atomic electric power plants boils down to a clamor to use a new kind of fire as a source of heat in generating electricity. There is no big change in the electric end of the generating station. A turbine can run on steam from any fuel, coal, oil, gas, atomic energy, or sawdust. A kilowatt-hour of electricity generated from atomic fuel has no special virtue. It is exactly the same as a kilowatt-hour generated by any of these other fuels, or by water power or diesel engines. If the end product—kilowatts and kilowatt-hours—is the same with all kinds of fuel, in a free, competitive situation, the choice of fuel would ordinarily be decided by selecting the most economical and dependable fuel."

IT is difficult to think of anything short of war that would be less helpful to the welfare of the United States at this time.

Let's look at our electric power situation.

The United States has 6 per cent of the population of the world. In the United States we have 37½ per cent of *all* the electric power-generating capacity in the entire world.

The United States has *nine times* as much power-generating capacity *per person* as the average of all the rest of the world. Table II (page 225) gives the

most recent comparable power capacity and population figures.

These figures drive home the dramatic and astonishing superiority of the United States in electric power capacity. In passing, it should be mentioned that this has been and is one of the important factors which has helped the U. S. establish a standard of living so high as to seem incredible to much of the rest of the world.

It is a fact that the United States has *nine times more electric power capacity per person* than the average of the rest of the world. In terms of absolute power capacity, which is a measure of war poten-

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tial, the United States has more electric power capacity than the next seven countries combined. Table III (page 229) shows the most recent figures.

IN connection with Table III, consider the Russian nuclear power program which has been used to frighten the American people into believing the United States is being left behind in the nuclear power race.

At Geneva, in 1955, the first Russian nuclear reactor was described. It was a conventional, graphite-moderated, water-cooled pilot model and was not claimed to be economical.

Early in 1956 the Soviet Union announced its plans to build nuclear power stations with capacity of 2-2.5 million kilowatts between 1956 and 1960.

Their first large developmental plant is graphite - moderated, pressurized - water - cooled, which is entirely conventional. The Russians also announced that "up to ten types of pilot reactors" would be tried out. Three types remained unspecified but the other seven are less diversified than the list of reactors in the twenty United States nuclear power plants listed in Table I.

The Russian program lists the reactors as: (1) water-moderated and -cooled, (2) graphite-moderated, water-cooled, (3) heavy water-moderated, carbon dioxide cooled, (4) boiling water, (5) homogeneous, Uranium 233-thorium breeder, (6) graphite-moderated, sodium-cooled, (7) fast neutron fuel breeder, sodium-cooled.³

None of these reactors is new nor startling, nor is there any reason to suppose they are superior to the types now under

development and construction in the United States.

IF we accept the Russian program at face value and assume it is completed as stated, it would add 2.5 million kilowatts of electric-generating capacity to their present 32 million kilowatts, giving them 34.5 million kilowatts.

Our present United States electric-generating capacity is 130 million, and by 1960, when the Russian nuclear power plants are due to be in operation, United States electric power capacity will have grown to about 160 million kilowatts. We will still have more than four times as much electric power as the U.S.S.R. and we will have more different types of nuclear power plants than the Russians say they intend to have.

The British program is somewhat different in kind but not much different in degree. Great Britain is faced with two urgent problems: (1) The need for plutonium in her atom bomb program and (2) England is running out of coal.

Home-produced coal costs the English \$11.20 a ton and it is the cheapest coal in Europe. At that price, Britain's coal-fired electric-generating stations produce electricity at about seven mills per kilowatt-hour. But Britain is having to import some coal from the United States at \$28 a ton.

Against fuel prices of that order even present-day nuclear power plants have a good chance of competing effectively. When this high fuel cost is coupled with the operating credit allowed for the production of plutonium, the stated cost of generating a kilowatt-hour becomes dependent upon the government price for plutonium. Hence the power costs can be

³"Nucleonics," McGraw-Hill, New York, August, 1956, pp. 31, 32.

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made to come out at any figure desired.

As Stage 1 of her program, Great Britain will build seven large graphite-moderated, carbon dioxide-cooled nuclear power stations in the next four years, with a total capacity of approximately 730,000 kilowatts. Stage 2 of the plan provides for nine additional graphite-moderated, sodium-cooled plants for completion by 1965. These nine stations will have a total capacity of about 1.2 million kilowatts.

When all of these plants are finished and added to the present power capacity, Great Britain will have a total of 26,430,000 kilowatts in 1965. At that time the power capacity of the United States will have grown to be about 200 million kilowatts. Where we now have about five times as much power capacity as Great Britain, we will then have about eight times as much.

From the announced programs of the Soviet Union and Great Britain it becomes clear that talk of losing the "kilowatt race" is based upon misunderstanding. The United States is in no danger of losing the kilowatt race, either in total kilowatts or in kilowatts of nuclear power.

But we may be in real danger of being stampeded into building large numbers of big nuclear power plants before we have

found out the best type of reactor to build. We will then have irrevocably committed a large amount of technical skill and time and a considerable amount of valuable materials in a worthless cause.

Unless the nuclear power plants can produce electricity at an over-all cost truly competitive with over-all cost of electricity from conventional generating plants, the nuclear plants will be an unnecessary drain upon scarce technical and scientific talent and a waste of material resources of the nation.

At present only the government can own fissionable materials. Hence, all prices of nuclear fuels are dependent upon what the government decides the price should be. It is therefore difficult, if not impossible, to determine what the actual cost of nuclear power really is.

Dr. W. H. Zinn, former director of Argonne National Laboratory, stated:⁴

Power reactors are not developed to a degree which allows firm estimates of the power production costs. . . . Such studies always have included a credit for the by-product nuclear materials which are produced. . . . Since the only customer for the by-product materials

⁴ Senate Report No. 2390, June 29, 1956, 84th Congress, 2nd Session, Civilian Atomic Power Acceleration Program, Appendix I, pp. 18, 19.



TABLE III

Country	Power Capacity	Population
Russia	32,000,000 Kw	200,200,000
Great Britain	24,500,000 "	50,968,000
West Germany	17,150,000 "	50,366,000
France	16,240,000 "	42,774,000
Canada	13,971,000 "	15,818,000
Japan	13,500,000 "	89,269,000
Italy	12,587,000 "	48,107,000
Total	129,948,000 "	497,502,000
United States	130,414,000 "	165,248,000

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is the government, the power cost is determined by government policy with respect to the price of by-product materials.

Since the power reactor industry is not developed, it is unwise to issue great claims for the economic advantage of one reactor type over another. Rather, at the present time, it is well to assess the potential competitive status of nuclear power. The choice of a specific reactor type and design by commercial builders and operators will probably be based more on which reactor features have the most development background and operating experience than on any cost analysis. . . .

. . . With probable operating and maintenance costs of 1 to 1.5 mills per kilowatt-hour, a total power production cost of 8 to 12 mills per kilowatt-hour is not unreasonable to expect from a second round of large power reactors. The following table from the McGraw-Hill reference⁵ illustrates the level of confidence which is shown for the nuclear power industry:

*Power Reactor Electrical Production Costs,
Mills Per Kilowatt-hour*

	<i>"Near Future Reactors"</i>	<i>"More Distant Future Reactors"</i>
Fixed Charges:		
Capital	4.8 to 6.4	3.2
Fuel Inventory ..	1.0 to 2.5	0.5
Fuel Fabrication and Separation	1.2 to 1.7	0.2
Fissionable Material Make-up	0.0 to 0.4	-0.3
Operation and Main- tenance	1.0 to 1.5	0.5
Total	8.0 to 12.5	4.4

The costs in this table include no element of research and development, nor

is escalation considered. The headings "Near Future" imply about ten years, the "More Distant Future" about twenty-five years. These figures may be compared with an average cost of 6 to 7 mills per kilowatt-hour from current United States private utilities using fossil-fueled plants. The very best, large generating stations now being built or planned for locations in the heart of the coal region are expected to produce power at 3.5 mills per kilowatt-hour.⁶ It is seen that the nuclear power industry is expected to become competitive with the best.

NOTICE four important points in what Dr. Zinn has said:

A. The cost of present-day nuclear electric power is higher than the cost of power from conventional fuels. Present-day nuclear costs being about 8 to 12 mills compared to 6 to 7 mills for conventional fuels.

B. In about twenty-five years, or possibly sooner, nuclear electric plants are expected to produce power at about the same cost as the best present-day steam-electric plants.

C. It is expected that there will be a *negative cost* for fuel consumed. This means that the breeder reactors are expected to be the reactors of the future.

D. If ownership of uranium and other fissionable materials is then still a government monopoly, and the value, or price, of fissionable materials is set by government edict, the cost of nuclear electric power production will still be dependent upon government edict and

⁵ Nuclear Engineering Handbook, McGraw-Hill Book Co. (To be published.)

⁶ "The Geography of Aluminum Changes Again," *Business Week*, June 16, 1956, pp. 88-103.

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not upon operating economies or efficiencies.

Now let us summarize what we have been over and see if it begins to point toward an intelligent course of action to be followed in the long-time interest of all of the people in the United States.

1. The United States now has $37\frac{1}{2}$ per cent of all the electric power capacity in the world. We have more than the next seven countries combined, which include Russia, Great Britain, West Germany, France, Canada, Japan, Italy. We have *nine times as much electric power per person as the average of the rest of the world.*

2. In the United States at the present time and probably for some years to come, electric power from nuclear energy will cost more than electric power from conventional fuels.

3. It is not in the interest of the United States and it does not make any sense for the U. S. to get trapped into a race with other countries to see which country can generate the most kilowatt-hours from nuclear energy. A kilowatt-hour generated with nuclear energy is exactly the same as a kilowatt-hour generated with steam or water power or diesel engines. A pure "kilowatt race" is senseless as a nuclear power policy for the U. S.

4. There are at least 100 possible combinations of moderators, coolants, and fuels for reactors. Probably twenty combinations now known appear promising for economic power production.

5. The cost of present-day conventional fuels will slowly rise over a period of time because of higher transportation cost and higher mining, extraction, and

processing costs as the best located deposits are used up.

6. Greater nuclear knowledge and improved nuclear reactors will steadily improve the efficiency of nuclear power generation.

7. Until there is a free market somewhere for fissionable materials it is impossible to determine the real cost of generating nuclear electric power.

To what course of action do these facts point?

EVERYONE concedes the desirability of maintaining our lead in nuclear technology. This means we must have a continuing, vigorous, and large-scale research and development program aimed toward new techniques, methods, and possible discoveries. This is one of the important and proper functions of AEC and Chairman Strauss has repeatedly so stated.

Sound economical development of nuclear electric power is more likely to occur if nuclear power is not made a vehicle for advancing the cause of government ownership.

Our wise course of action would seem to include at least these things:

Use AEC funds vigorously to defray research and development costs on prototype plants embodying reactor concepts of an advanced type. This is a continuation, and possibly an acceleration, of the AEC program already in operation.

Continue and expand the training and schooling program for nuclear technicians at the Oak Ridge National Laboratory so as to add to the pool of trained man power.

PUT into effect the suggestion made by Chairman Willis Gale of Commonwealth Edison Company before the

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Atomic Industrial Forum in Chicago September 26, 1956, that "The utility constructing a 'demonstration' reactor as part of the AEC program should pay an amount on the basis of which the power costs, including fixed charges, operating expenses, and fuel costs, would be the same as the cost of power produced by conventional facilities. This would mean that a utility in a high-cost fuel area should be able to pay more per kilowatt than a utility in a low-cost fuel area. The contribution by the AEC would be the difference between the utility's investment and the total cost of the plant. . . . The amount spent by the government would be truly a research and development cost—an amount to achieve competitive nuclear power which is in the interest of all the people. . . . This policy should be continued on a basis designed to minimize the public *versus* private power controversy. I suggest that the number of government dollars spent for each be roughly proportional to the present amount of public power as compared with the present amount of private power."

Build no more large "demonstration" reactors than are actually needed to collect an adequate amount of operating data to form a reliable judgment as to the economic worth of each particular reactor concept tested by "demonstration" plants.

Publish and make available to industry the power cost data on each of the demonstration reactors.

Pass an indemnity statute to protect operators of nuclear installations against excessive public liability beyond the reach of commercially available insurance protection.

IF these points are followed and this line of action is coupled with governmental action which facilitates export and construction of reactors in foreign countries with deficient or high-cost fuels, we will maintain the U. S. leadership in nuclear technology, assist other countries to obtain more economical and larger supplies of electric power, and avoid the danger of trapping ourselves into a large government ownership program for nuclear energy.

The Real Giveaway

"THERE is no giveaway when tax-paying private enterprise develops the natural resources of this country, whether through harnessing of water power or through the mining and processing of coal or iron ore or lead or silver or gold or through the tilling of the soil.

"The real giveaway occurs when the federal government itself builds and operates power plants with the tax moneys collected from all the taxpayers of the nation and then sells the electricity at less than its real cost to a preferred group of people. A portion of your tax money and my tax money is thus 'given away' to such preferred electric customers."

—WALTER H. SAMMIS,
President, Ohio Edison Company.

Cost as a Basis for Gas Field Price Fixing

One of the most controversial factors involved is the FPC's use of traditional cost methods as applied to producer rates. This article, from the standpoint of one engaged in the gas distribution business, although expressing only his personal opinion, explores the possibilities and variations of cost price regulation in the field of natural gas production.

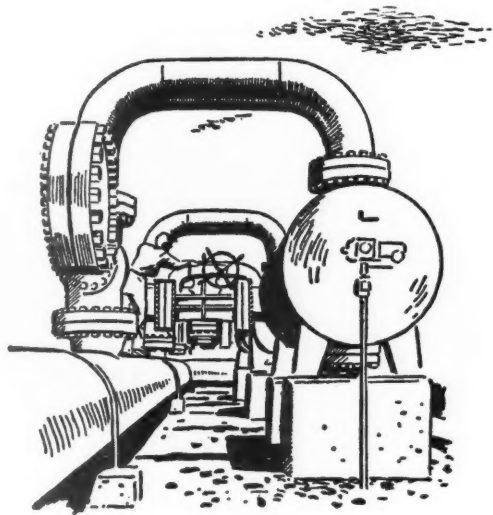
By CHARLES H. FRAZIER*

THE 85th Congress will almost certainly have to cope with a variety of bills to amend the Natural Gas Act, as it relates to the regulation of field prices of gas sold in interstate commerce. These bills will range from proposals by those who believe in strict regulation over these prices, designed to enable the Federal Power Commission to streamline its activities rather than to curtail its powers, to bills designed primarily to accomplish

the latter purpose, leaving little check to natural gas prices, save the law of supply and demand. Most of these bills, it now appears, will provide for some measure of federal regulation of field prices. A key question in their evaluation, however, will be, "Should the Federal Power Commission consider the cost of producing gas in regulating field prices, or should it consider only the market price, no matter how derived?"

In providing an answer to this question, it is necessary first to restate the reasons

* Member of the staff, Philadelphia Gas Works. For additional personal note, see "Pages with the Editors."



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why regulation is necessary at all; for learned economists for the producing companies have submitted pages of testimony before the Congress and the Federal Power Commission to prove otherwise. Their usual argument is that the law of supply and demand is the most perfect mechanism yet devised for attributing value to a commodity, and that regulation is, therefore, hardly necessary—perhaps only in instances of community of interest, or affiliation, between producers and pipelines. Their arguments appear persuasive, in abstract, and conform to orthodox economic theory; it is when they apply general economic theory to this particular problem that they go astray.

AN economist in the Tidewater proceeding (Docket G-9932), for instance, makes a great point of the difference between regulating distributors' rates, where he says, because of monopoly conditions, this is necessary to protect the public interest; whereas he says with "competition" prevailing in the field, the same monopoly conditions do not exist and the law of supply and demand can be allowed to operate. There are two things wrong with this and similar arguments. One is the fallacy that gas distributors have a monopoly, which hardly needs elaborating for PUBLIC UTILITIES FORTNIGHTLY readers. The second is that competition (between producers) prevails in the field; with the concomitant thesis that the buyer of the product (the pipeline) has a predominant interest in keeping the price as low as possible, and has a "value" in his own mind above which he is unwilling to go. As has many times been pointed out, the pipelines do bid for the gas they

seek — against each other — with each round of bids bringing higher prices.

They have little difficulty, in the usual instance, in passing on this increase to distributing companies, which, under the present pattern of natural gas purchasing, are committed to long-term contracts, whatever the price.

FOR a good half of the country, the point has not yet been reached where the city gate price for natural gas is so high that distributors refuse to agree to purchase additional natural gas from their pipeline suppliers. Consequently, these pipelines can, with impunity—and this the producers know—pay higher and higher prices as they purchase supplies to meet the year-by-year increases in the distributing companies' requirements, and, equally important, as they replace gas reserves currently being used up. Thus, for this important segment of the market, there is little or no brake upon inflationary gas prices by the "law of supply and demand"; and the point of equilibrium is still quite a long way down the road.

In the other half of the country, the price of gas, as delivered in the market place, has already reached the point where further increases will jeopardize gas' competitive position. The pipelines serving the East and the North no longer are confronted with an insatiable demand for additional supplies. However, as the economy expands, growth requirements must be met, and, in addition, replacement must be made of supplies currently being used up. Consequently, while such pipelines may stay out of the natural gas-purchasing race during any one year, or maybe two, sooner or later they must get

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back in, and pay whatever price has been arrived at in the one-sided competition between buyers serving nearer markets. The price they pay, therefore, is bound to go up, in the absence of regulation of natural gas field prices, no matter how conscientious they may be in attempting to bargain on behalf of their customers.

THE test of a free market is one where the buyer and seller can come together, each with his own concept of the value of the product, and where they are each free to walk away if they do not like the price. It is the position of many gas distributors that the state of the market for natural gas is such that this type of situation has ceased to exist. They hold that the real purchaser is rarely at the bargaining table when gas supplies are auctioned off, and his concepts of value are, therefore, not available when the price is set. Moreover, under the terms of most existing contracts, the field price of gas already committed to distributors may be increased overnight, by as much as 100 per cent, through operation of favored nation or other formulary price re-determination clauses about which we have all heard so much.

Accordingly, it is the belief of these dis-

tributors that, in the light of the wide public interest involved and the lack of other protection of the ultimate consumer, some form of effective price review by a competent public agency must be applied at the beginning of the interstate journey.

Is Cost Necessary?

IF this view is valid, and there is a sound basis for imposing price regulation on these transactions, it follows that the essence of such regulation involves a balancing of interests between the producer and the consumer; and this, in turn, means economic interest. Thus the impact on consumers of increases in the field price of natural gas must be considered by the regulatory agency—FPC—and, by the same logic, the need of the producers for higher prices must be established. Finally, need must relate to economic factors in the finding and producing of natural gas, if regulation is to mean anything at all, and not merely to market price factors resulting from competitive bidding by pipelines. This, in turn, means that cost evidence is an essential element in these regulatory proceedings.

The commission has already recognized this in a recent producer rate proceeding involving Union Oil of California



“THE 85th Congress will almost certainly have to cope with a variety of bills to amend the Natural Gas Act, as it relates to the regulation of field prices of gas sold in interstate commerce. These bills will range from proposals by those who believe in strict regulation over these prices, designed to enable the Federal Power Commission to streamline its activities rather than to curtail its powers, to bills designed primarily to accomplish the latter purpose, leaving little check to natural gas prices, save the law of supply and demand.”

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(Docket G-4331),¹ holding that this is necessary under the law as it now stands. It is submitted that it will still be necessary under any amended law which, to quote the President's veto message, is to include "specific language protecting consumers in their right to fair prices." The problem then is not "if," but "how" can cost be found and related to prices.

A New Regulatory Technique Needed

IT is a foolhardy man indeed who ventures into this uncharted sea. As one who has participated in many proceedings, formal and otherwise, where this has been an issue, I am well aware of the many divergent and conflicting views on the subject. There are differences between branches of the gas industry and among the distributors themselves, so what follows must of necessity be one man's view, evolved from many strenuous but helpful discussions on the subject.

It would be well at the outset to demolish two straw men created by those who do not want any regulation at all: (1) We are *not* talking about "utility type, original cost, rate base regulation"; nor are we contending that (2) there is any single, exactly determinable cost for each supply of gas subject to regulation. If the producers would accept this, their difficulties with the cost concept would markedly diminish and, with their constructive help, fair and workable regulatory principles could be developed to include a proper recognition of the cost element. I am sure they would agree with us that they do know what it is costing them to discover and produce oil *and* gas, know how these costs are changing, over

the years, and have available reasonable cost allocation methods, as does any other multiproduct producer, which enable them to assign ranges of values to each product. I am confident, therefore, that producers can submit, in appropriate proceedings before the commission, meaningful data which can guide it in determining the equity of requests for higher field prices.

ACCORDINGLY, it is suggested that the Federal Power Commission would do well to lay aside methodology previously employed, of attempting to ascertain for each particular supply the exact cost of discovering and producing that supply, including a specific "return" on the capital investment in that particular unit of production—a well-nigh impossible task. Instead, it is suggested that, in this field of regulation, the consumers' best interests will be served if we establish as the objective revenues from gas sales sufficiently high—but no higher—so as to foster the continued exploration and discovery of new supplies, to keep step with the country's growth and to replace supplies currently being used up; and that, accordingly, the general economic "well-being" of the gas department of a producing company be the standard, rather than rate of return on a particular amount of invested capital. This bears a close resemblance to the operating ratio theory under which certain transportation agencies are regulated.

It should be borne in mind in this connection—and this is one of the principal bases for the conclusion above stated—that the costs of discovery are the principal elements in the over-all cost picture of a producing company. Furthermore,

¹ 16 PUR3d 112.



True Value of Gas as Such

"GAS has no 'intrinsic value' under the Arabian desert—or even under the Gulf of Mexico. It HAS value if found and brought to the surface within economic piping distance of a market. When part of this process has been completed—I.E., the approximate finding phase—and this cost recorded, the LAND under which gas is believed to lie does acquire 'intrinsic value' over and above its value as farm land. This is measured in the cost to the producer of acquiring either the land itself or the right to produce gas from it, all of which cost finds its way into the cost of gas as we have suggested it be determined."

such costs, as the economists point out, can never with any accuracy be derived for a particular unit of production, since there must be assigned, to be fair to the producers, the cost of *not* discovering gas or oil; and in giving effect to such costs, it is obviously impossible to attribute to the cost in a particular field, the one correct amount for the cost of failure.

THERE is another reason for not taking the cost of discovering and producing from a particular field or area as the criterion of cost to be used in judging the fairness of a natural gas price. Thus, if this practice were carried to its logical

conclusion, a set of rates would be accumulated which would relate only to past costs of discovery, and, in consequence, the revenues received by a producer for his natural gas might well not be sufficient to encourage him to continue in the exploration of gas and so to continue to block out reserves ahead of production. Where a producing company finds it has exhausted its opportunities of finding gas in the better explored areas, the distributor's best interests will be served if it is encouraged to branch out into entirely different areas. Thus, it is to the interest of a gas-distributing company on the East coast that additional gas reserves be

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discovered in Wyoming, even though it may never receive such supplies; because by that discovery the total reserve of the country will be improved and the pressure on the existing reserves from which this East coast company draws will be reduced.

A further reason for considering the total cost picture for a gas-producing company is the difficulty of proration between its gas and oil divisions. This will be discussed below, but suffice it to say at this point that the problems with respect to cost assignment to a particular field increase in geometrical ratio when we throw in the complication of cost proration between gaseous and liquid fuels.

For the reasons above stated, it is believed that the Federal Power Commission should familiarize itself with the entire production cost record of a company whose rates are under investigation, with principal emphasis, of course, on its gas division. Some might argue that the gas division, even on the basis of the most logical proration of costs, would not need to be particularly profitable, if the company's over-all profit picture were favorable. However, we are interested in *gas* exploration and development, and it does not appear logical that gas distributors and their customers should attempt to get a "free ride" on a company's success with its oil business.

Cost Allocation between Oil and Gas

PERHAPS the single most important element in deriving cost is the method of allocating common costs as between gas and liquid petroleum products. Producers have suggested, as a basis for the allocation of cost between gas and oil, the relative heat content of the two products. This

has the virtue of simplicity, but nothing else. Gas and oil are chemical compounds and their values derive from their chemical and physical characteristics. Heat content is only one of these characteristics, and taken by itself is a misleading indicator of value. Gas is called the "premium fuel"—at the point of consumption—but it is oil which is the premium fuel at the wellhead—and for two simple but controlling reasons: being more compact, it is much cheaper to transport to the market place, and it is a much cheaper source of mobile power—gasoline—for which the American public pays more than for all other oil and gas products combined. Then, too, what credit should be given the gas side for the important rôle gas plays in maximizing the amounts of oil realized from underground reservoirs and bringing it to the surface?

It would be nice if these and other pertinent factors could be put together in a formula—but if discoverable at all, this formula might be so complex as to be impractical of use. Instead, there exists at least one logical basis—the relative values put on these two products by the producers themselves in the pre-Phillips period, let us say the five years ending 1953. By using such a standard, a "least common denominator" for the relative merits of the two hydrocarbons can be arrived at.

ANOTHER highly important problem is the question of whether producers should include, in their cost base, the federal income tax they might have paid were they not eligible for the special treatment provided them under the tax laws. This is a large item, since, because of this treatment, many producers pay only a

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nominal tax. Were this knotty problem to be considered by itself, it might be difficult to solve, with equities on both sides. However, if coupled with the problem of cost of money, the answer may be seen more clearly. Thus, because of the favorable tax treatment accorded producers, they are able to explore for further supplies of oil and gas with money which would otherwise be paid in taxes. This, in turn, permits them to raise any additional capital funds needed at a very favorable rate, and the price-earnings ratio of companies engaged primarily in oil and gas production is usually far higher than the corresponding figure for companies in the utility field, where theoretically the investors have better protection. It is fair to say to the producers, therefore, "Yes, you may keep the advantage Congress has given you, of exploring with funds which would otherwise be paid in taxes; but you in turn have to concede the fact that, as a result of this, your cost of money is very low."

PUT in another way, the commission would appear to have the alternative of allowing federal income taxes as they would theoretically be paid, and holding the cost of money down to the relatively low rate set by the market for producers'

securities; or, on the other hand, allowing the substantially higher cost of money which would result if it were necessary for producing companies to speculate, in their exploratory efforts, with funds secured from investors. It is submitted that either approach will produce approximately the same result. Whatever the treatment, however, the key to the solution of this problem is to handle the tax item in the light of the purpose for which Congress gave the concession in the first place—exploration—and the use to which the producers generally put the funds which would otherwise be paid in taxes.

THE question arises as to whether a uniform system of accounts is essential for the purpose of reviewing costs. Certainly, it would be far easier for the commission if it could require such a system, and require that all operating and capital costs be restated in accordance with it.

However, the regulatory pattern here under consideration does not seem to indicate such a requirement. Oil companies are not being regulated, and, until the Congress requires otherwise, it should be within the managerial prerogative of such companies to determine how they wish to classify the various costs incurred, as be-



Q "It should be borne in mind . . . that the costs of discovery are the principal elements in the over-all cost picture of a producing company. Furthermore, such costs, as the economists point out, can never with any accuracy be derived for a particular unit of production, since there must be assigned, to be fair to the producers, the cost of NOT discovering gas or oil; and in giving effect to such costs, it is obviously impossible to attribute to the cost in a particular field, the one correct amount for the cost of failure."

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tween operating and capital accounts and within the operating account categories. The commission should, however, require that the cost method employed by a particular company be consistent, that it be clearly stated, and that it be in sufficient detail so that the significant elements can be identified, and prorations as between gas and oil properly applied.

IN the light of the experience of the past two years, the following hypotheses are suggested as a guide in determining producers' gas costs:

The traditional rate base approach cannot be used. This approach is valid if (1) the ratio of capital to income is high, as it is with electric, gas, and water companies; and (2) the costs incurred in a given year relate primarily to the sales of that year. Neither condition is present in the gas-producing industry. Here the operating ratio method of regulation seems indicated. Attention should be concentrated on the income statement of the gas division for the test year, with appropriate allowance made for the cost of capital (including the element of profit). Also, because of fairly wide year-to-year variations in exploratory and development costs, the technique of "normalizing" will undoubtedly need to be brought into play.

Absolute cost is not obtainable, because of the problem of proration as between oil and gas. This is a truism, and requires no further elaboration.

In considering the various costs of exploration and production of oil and gas, reasonable attempts must be made at segregation of individual items; but for many elements this will not be practical, and these costs therefore must be considered joint and suitably allocated. Thus, dis-

covery cost is one of the most significant cost elements, and it is the exception rather than the rule where it is possible to segregate costs attributable to gas discovery from those related to oil discovery.

WHERE proration is necessary as between gas and oil, relative value at the wellhead should be the basis. The deficiencies of other methods have been discussed. In the course of further study, and with the producers' co-operation, better yardsticks may be evolved; but in the light of what we now know, the values attributed by producers in the period preceding effective field price regulation provide the soundest starting point.

Costs should not be limited to a particular field but should be considered for an appropriate division of the company as a whole. This may well be the continental United States, although sections that are entirely distinct geographically, such as the Appalachian region and the Williston basin, or California, might be separated therefrom.

The cost base should be the records of an individual company and not of a group of companies in any particular field. This may produce varying prices in the same area, but supply contracts from the same reservoir now often bear different prices; and there is little more logic to the pattern of differentials between fields. There would appear to be no overriding reason why gas prices must in the future be more uniform than they are now.

In the process of regulation, the commission will acquire a good basic background in cost levels, which should also be taken into consideration in determining rates for an individual company. Thus, a company fortunate enough to have a very



Undesirable Escalation Clauses

"I*t is hoped that the commission will adopt Rule R-153 outlawing undesirable escalation clauses in new contracts; and this might well be extended to existing contracts, after an initial renegotiation. In the consideration of such increases, and other requests for increases that may come before it, the commission could well concern itself with changes in cost which have taken place since the contract was negotiated, rather than the current cost level. Equity requires that the originally agreed-upon price be given proper weight, but where cost conditions have altered appreciably, the extent of the change should certainly be a factor in the amount of increase allowed, so long as the resulting price remains within the 'fair commodity value' range."*

good cost record should not necessarily be penalized for having been successful in finding gas cheaply, and, conversely, the high-cost company may not be able to recover the full, theoretically allocated gas cost.

With this background, the commission can reduce to a minimum the regulatory burden on small producers. No more crocodile tears need be shed for the farmer with one well. The establishment of ranges of values should enable FPC largely to relieve small producers of their regulatory responsibilities under the act; and only where a producer can negotiate

a price outside of this range, would he have to justify the higher price.

Precise accuracy should not be claimed for these determinations, but rather the costs arrived at should be viewed as reasonable standards against which may be judged whether or not a given price is suitable, in being properly compensatory and properly encouraging of further exploration.

Methods of Application

WITH cost finding as above described, it should be possible for FPC to determine, within reasonable limits, a pro-

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ducer's cost level of finding and producing natural gas. There still remains the complex problem of applying such a finding in a specific rate case, where many other elements of value must be considered. Here the location of the field becomes important, in its accessibility to the pipeline and to the market, the size of the reserve, the conditions of delivery, and other elements which may be unrelated to cost itself.

The solutions to this problem will only be evolved as a result of many proceedings before the commission, and some no doubt in the courts. Certainly no pat answer will suffice; but the suggestions herein advanced would be incomplete were I not to sketch in broad strokes at least, the general framework in which this cost concept is advanced.

This framework contemplates the establishment for wide producing areas; e.g., Texas railroad districts, of bands of values—the term “fair commodity value” has been suggested—with the minimum for the band in the order of the average realization for a base year—say 1954—and a maximum, or ceiling, at the level of the prices in contracts negotiated during the past few years. Enough has been seen of cost figures to make it appear that they will in most cases fall within these bands—though probably toward the lower limits.

IT is next necessary to distinguish between proceedings involving initial prices and those where increases in prices are sought. In the case of the former, the negotiated price should prevail, if it falls within the “fair commodity value” range, and does not exceed cost. If the price sought is higher than can be justified by

generalized cost data, the burden of proof would be on the producer to demonstrate how, in that particular instance, other elements of value justified the higher price; always within, however, the “fair commodity value” range. This range, in turn, would only be affected as and if the present upward cost trend in producer costs raises the whole price level.

The emphasis should change where the case involves a filing for an *increased rate*. It is hoped that the commission will adopt Rule R-153 outlawing undesirable escalation clauses in new contracts; and this might well be extended to existing contracts, after an initial renegotiation. In the consideration of such increases, and other requests for increases that may come before it, the commission could well concern itself with changes in cost which have taken place since the contract was negotiated, rather than the current cost level. Equity requires that the originally agreed-upon price be given proper weight, but where cost conditions have altered appreciably, the extent of the change should certainly be a factor in the amount of increase allowed, so long as the resulting price remains within the “fair commodity value” range. Needless to say, the extent to which prices have already escalated, since the date when the gas supply was first committed to interstate commerce, should have an important bearing in determining what further increase might be fair.

THE adoption of this approach may well have some further leveling effect upon gas pricing, even with the outlawing of favored nations clauses. This is not of itself necessarily undesirable. Certainly, the approach should not be used to “guar-

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antee" to an unsuccessful operator his full cost, and, therefore, put no incentive upon careful and economic exploration. Conversely, the successful operator should not be penalized for his intelligent geophysical work which has enabled him to find oil or gas at less than average cost to the industry. This does not mean that the objective should be one price to all producers in a given area, but rather that the pattern of industry costs should be taken into consideration in judging the fairness of rate increases as they may come before the commission.

One last word on the alleged "intrinsic value" of natural gas. It is implicit in the suggested approach to the development of cost that there is no such thing. Gas has no "intrinsic value" under the Arabian desert—or even under the Gulf of Mexico. It *has* value if found and brought to the surface within economic piping distance of a market. When part of this process has been completed—i.e., the approximate

finding phase—and this cost recorded, the *land* under which gas is believed to lie does acquire "intrinsic value" over and above its value as farm land. This is measured in the cost to the producer of acquiring either the land itself or the right to produce gas from it, all of which cost finds its way into the cost of gas as we have suggested it be determined.

IN summary, we believe that cost finding is and will continue to be an essential part of the regulatory process; that new approaches are necessary; and that it will be possible to develop procedures by which the Federal Power Commission can determine fair cost levels, against which it can evaluate rates for natural gas in the field as they may be proposed. We believe that the end result can mean an economically healthy and expanding producing industry, while at the same time affording protection to the consumer against unnecessary price increases.



"FEDERAL controls over the field price of natural gas would lead inevitably to the diversion of this highly desirable fuel from domestic consumers, supplied by interstate transmission companies, to other markets.

"No other basic commodity is now subject to federal price fixing. Government controls in the case of natural gas could open the door for the further encroachment of such controls and for similar fixing of the prices of other basic commodities, such as lead, zinc, coal, iron, cotton, wheat, corn, and automobiles. This is the path to nationalization, and to the destruction of a free economy. Congressional action is necessary to remove this threat to the American free enterprise system."

—W. ALTON JONES,
Chairman of the board, Cities
Service Company.



Antitrust Policy: A Study In Contradiction

Early last year the federal government settled its antitrust suit against the American Telephone and Telegraph Company with a consent decree permitting Western Electric to remain in business as the manufacturing subsidiary for the Bell system. Since that time the Justice Department has started, prosecuted, and settled other suits involving other industrial combinations in carrying out a policy for enforcing antitrust statutes. What is that policy? Is it consistent, rational, and justifiable? This well-known writer in the field of business economics does not think so.

By DONALD I. ROGERS*

BESIDES being an autocrat at the breakfast table and a hardheaded arbiter on the bench, Oliver Wendell Holmes also had a gift for the pithy phrase, but when he resignedly called the Sherman Antitrust Act "a brooding omnipresence in the sky," he got off what is probably the greatest understatement since John Alden was told to speak for himself.

The "omnipresence" of the act and all its works and pomps is undeniable. In recent years, its grim shadow has impar-

tially blanketed General Motors, du Pont, the investment bankers—for all we know may be one of the reasons why Polly Adler switched from entrepreneuring to writing—and any day now may be seized on "to break up the Yankees."

Unfortunately, the Sherman Act's omnipresence, in the last several decades, has too often been equated with omnipotence, and a close look at the statute and its corollaries suggests it has resoundingly and resolutely been bedded in contradiction.

Not the least of these contradictions, so far as a major segment of the business

* Business and financial editor, *New York Herald Tribune*. For additional personal note, see "Pages with the Editors."

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community can see, is the spectacle of a Republican administration, avowedly dedicated to rooting out a mare's-nest of economic imbalances that cropped up over the last twenty-five years, unabashedly hewing to the same old pattern and making political hay out of a "tough" anti-trust policy.

THE figures show just how tough it has been. From mid-1953 until March of last year, a Republican-headed Department of Justice filed 98 new anti-trust cases, and closed out 138 pending cases, almost as many as had gone on the docket since the Sherman Act was framed in 1890. Over the entire history of the act, the Justice Department set a grand total of 24 contempt proceedings in motion. Eight of these—one-third—date from this administration's accession.

This is quite a record, and after taking a good look at it early last year, the *Herald Tribune* queried then antitrust division head Stanley N. Barnes for a policy statement. Mr. Barnes, who is now basking in what may be the more congenial environment of a federal judgeship, replied in a way that did little to clear the air.

His leadership, he said, was doing a lot to spike Democratic charges the administration was indentured to "Big Business." This admission, on the face of it, seemed proof enough the antitrusters, as they have in the past, were using legal and economic means to political ends.

This contradiction has long been implicit in antitrust administration. The laws leave so much room for interpretation that they have become not a norm by which a businessman can measure his activity, but a weather vane shifting with every change

in the political wind. There are other contradictions, equally as imponderable. One of these—"How big is too big?"—has badgered generations of jurists.

THE "rule of reason" used to be the touchstone. This was propounded in the Standard Oil case of 1911. Drawing a bead on the operative sentence of the Sherman Act—"every contract, combination, or conspiracy in restraint of trade or commerce among the states . . . is . . . illegal"—the Supreme Court ruled only "unreasonable" combinations verboten.

This dictum was further extended in 1920 when the court indicated that "mere size—or existence of unexerted power" cannot be regarded as *prima facie* evidence of monopoly. The New Deal came up with a very, very different construction. Declaring open season on big business in particular, it nourished the concept of "soft competition" through NRA, Robinson-Patman and Millard Tydings on one hand, and greatly narrowed antitrust interpretations on the other, theoretically at least, to promote "hard competition."

Thus by 1946, the Supreme Court, which as "Mr. Dooley" had long since pointed out, "follys th' iliction returns," had come full cycle.¹ It ruled then re-

¹ Peter Finley Dunn's Mr. Dooley was something of an antitrust expert in his own right. He once spitted Teddy Roosevelt's rather ambivalent "big stick" outlook on the trusts in this comment: "Th' thrusts," says (Roosevelt), "are heejous monstheres built up by th' inlightened intherprise of th' men that have done so much to advance progress in our beloved counthry," he says. "On wan hand I wud stamp them undher foot; on th' other hand, not so fast. What I want more thin th' bustin' iv th' thrusts is to see me fellow counthrymen happy and continted. I wuddent have thim hate th' thrusts. Th' haggard face, th' droopin' eye, th' pallid complexion that marks th' inimy iv thrusts is not to me taste. Lave us be merry about it . . . Lave us laugh and sing th' octopus out iv existence."

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straint of trade could be inferred from a situation in which "power to raise prices (in concert) or to exclude competition" existed even if this power had not been wielded.

THIS construction, despite all anguished cries out of Washington to the contrary, is seemingly still in vogue, as the controversial General Motors-du Pont antitrust case indicates. Still the fundamental question—"How big is too big?"—remains and it proved a stumbling block even for so formidable a jurist as Learned Hand. In the Alcoa case he could do no better than vaguely rule that a market concentration of somewhere between 30 and 90 per cent was proof of monopoly.

This kind of blanket generality shows no standard of bigness can be elicited from the antitrust laws as they now stand. Judges have been trying to do so for years and all of them have come a cropper. Yet the equally hard fact remains that unless some coherent standard does evolve, the economy will continue to suffer under the body blows of legal absurdities.

These absurdities are nowhere more patent than in the Justice Department's attitude to "bigness" in the auto and steel

industries. Even a government lawyer would be hard put to find a field more toughly competitive than automobiles.

Proof of this competition shows in the plight of the "independents" who have steadily been losing ground to the "Big Three," particularly General Motors. The antitrust laws were designed to promote competition. In free competition, no one can gain, especially the consumer, without some industrialist losing. Yet the Justice Department approved mergers between Nash and Hudson, Kaiser and Willys, Studebaker and Packard, and now between Curtiss-Wright and Studebaker-Packard.

At the same time, it trained its biggest guns on General Motors, and in so doing seems to be trying the remarkable feat of working both sides of the street. The essential absurdity remains that the Justice Department can focus its fire on the competitor or on the competition, but not both.

IT has carried this same absurdity over into the steel industry, but with a reverse switch. If encouraging formation of a whole series of *ententes* to give GM a run for its money is good, does not this



Q "UNFORTUNATELY, the Sherman Act's omnipresence, in the last several decades, has too often been equated with omnipotence, and a close look at the statute and its corollaries suggests it has resoundingly and resolutely been bedded in contradiction. Not the least of these contradictions, so far as a major segment of the business community can see, is the spectacle of a Republican administration, avowedly dedicated to rooting out a mare's-nest of economic imbalances that cropped up over the last twenty-five years, unabashedly hewing to the same old pattern and making political hay out of a 'tough' antitrust policy."

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also hold true for the Bethlehem-Youngstown consolidation?

U. S. Steel accounts for about 30 per cent of the nation's open hearth capacity. Merging Bethlehem and Youngstown, the nation's second and sixth largest producers, respectively, would presumably sharpen competition for the good of all hands, yet the Justice Department, in what even for it seems to be a dynamic burst of illogic, has blown the whistle on the consolidation.

The hard core of this illogic rests in § 7, the "antimerger" section of the Clayton Act. When it was amended in 1950, legislators emphasized they wanted to take a "preventative rather than a curative" approach to mergers and maintaining competition.

Their intention was good, but as every barroom theologian knows, the road to perdition is paved with this kind of intent. In the six years since the amendment went into effect, the Justice Department and FTC have filed 16 complaints under it. None—not a one—has yet been adjudicated, largely because no one is quite sure what the amendment means.

THE section was designed to put a brake on mergers and yet has obviously had no more effect on them than pigeon flights in Central Park. Mergers, many of them quite unsound, are still running at a record-breaking clip. External acquisitions still account for less than 15 per cent of the nation's industrial expansion, but the sound and fury of it all has got legislators hot under the collar. Characteristically, they have reacted in a way that is now almost a conditioned reflex—by drawing up still more legal absurdities.

HAPPILY, many of their efforts have died in committee, but in this session of Congress, as in the last, there will undoubtedly be thrown in the hopper several bills demanding the Justice Department be given advance warning of any merger proposal.

One such bill last session had not only the support of the Justice Department, but the weighty dignity of the President's Council of Economic Advisers as well. For all its distinguished sponsorship, this bill, too, was essentially contradictory. It conflicted not only with basic precept of limited government intervention, but even with its own aims. Far from decelerating the merger trend, it actually might have made corporate marriage easier.

The bill required ninety days' notice (a) when one corporation planned to buy stock in another, if combined capital, surplus, and undivided profits of both exceeded \$10 million; (b) when one corporation planned to buy any part of another's assets, save its "stock in trade."

THE bill was written with such broad strokes of the brush as to cover subsidiaries merging with parent concerns, or consolidations of two or more subsidiaries of the same parent. Seemingly, it would also have applied, in splendid impartiality, not only to mergers, but to routine sales of obsolete machinery; accounts receivable to factors; sales and lease backs of plant and equipment.

Thus, it would have required a company like General Electric, say, if it wanted to sell \$5,000 worth of land to a local real estate firm, to give advance warning of the move because land is not its normal "stock in trade."



Erosion of Antitrust Laws

"THE antitrust laws are . . . chipping away at the nation's patent system, the slow erosion of which has long been a cause of concern to small businessmen especially. Instead of improving, the situation is getting worse. The consent decree American Telephone and Telegraph signed last year perfectly illustrates this point. True, the decree enabled AT&T to hang onto its Western Electric division, but the company had to hand over to all comers a pool of 8,600 patents, the world's largest, including twenty-six years of back-breaking development work on the transistor. Next to necessity, patent protection traditionally has been the mother of invention."

ANY compulsory advance warning would be bad. There is the odds-on chance that notice would affect stock prices at a time when they are normally the focus of very delicate negotiation. Perhaps even more important, any such law is bound to be self-defeating. It would swamp the Justice Department with an incredible amount of administrative detail.

The courts, by and large, have shown a proper reluctance to dissolve a merger once it has become effective. Unless the

Justice Department, within ninety days, managed to give careful scrutiny to a torrent of proposed consolidations, jurists would be very unlikely to order divestiture and on the solid ground that where two companies have gone to the government and the government was silent, that silence would constitute approval.

Approval is the last thing that should be given to the effect of the antitrust laws on American businessmen overseas. Their power does not stop at the water's edge

ANTITRUST POLICY: A STUDY IN CONTRADICTION

and is thwarting investment abroad at a time when it was never more necessary.

U. S. industrialists making a play for markets overseas almost invariably run into protective tariffs and currency exchange controls. They get around these barriers by selling patent rights to a foreign company or by merging with it and setting up a new foreign affiliate. The *quid pro quo* involved in this kind of agreement is a promise that the partners will stay out of each other's home preserves.

Should this happen in France, say, the parent agrees not to sell there, while the foreign firm promises to keep out of U. S. markets. In cartelized Europe, this is purely and simply a fact of business life. The Department of Justice, however, with a library full of legal precedents to back it, insists this is a gross violation of the antitrust laws.

IMPERIAL CHEMICAL INDUSTRIES and du Pont are a case in point. They swapped patents, set up joint ventures in Canada, Brazil, and Argentina, and promised to keep out of each other's markets. The Justice Department flashed the red light and broke up the combination. In the process, it also fractured benefits that would have accrued to stockholders, employees, consumers, Britain's chronic trade imbalance, and the free world.

Repeated instances of this have fostered the kind of winking acquiescence of law breaking generated by any bad law, much as with Prohibition. One American doing business overseas concedes: "There is not one of us over here not breaking the law in some way."

There have been suggestions that the government set up an agency like the

Federal Trade Commission to look over such deals before they are made and exempt those that seem in the national interest, from prosecution. This, however, seems to reflect the conviction that the best way to dissolve a bureaucratic snarl is to set up another bureau, and completely overlooks the fact that if the antitrust laws do not work at home, they are certainly not going to work in the completely different business context prevailing abroad.

THE antitrust laws are also chipping away at the nation's patent system, the slow erosion of which has long been a cause of concern to small businessmen especially. Instead of improving, the situation is getting worse.

The consent decree American Telephone and Telegraph signed last year perfectly illustrates this point. True, the decree enabled AT&T to hang onto its Western Electric division, but the company had to hand over to all comers a pool of 8,600 patents, the world's largest, including twenty-six years of back-breaking development work on the transistor.

Next to necessity, patent protection traditionally has been the mother of invention. In its usual contradictory fashion, the Justice Department insisted the broaching of AT&T's patent library would enhance the opportunities of small business.

The crosslicense, however, is a two-way street and many small operators have testified that, as crosslicensees, they no longer have any chance of pulling off a laboratory coup that would enable them to steal a march on AT&T or any other king-sized competitor.

And the patent question and consent

PUBLIC UTILITIES FORTNIGHTLY

decree aside, it would have been interesting to see just how far the Justice Department would have got by taking a "legal monopoly" like AT&T to court.

This, obviously, is a contradiction in terms and so, seemingly, are the "monopoly" marketing criteria the Justice Department is applying in the suit it recently filed against Continental Can Company.

The nation's second largest can maker, Continental has lately merged with Hazel-Atlas Glass Company and Robert Gair Company, Inc. Superficially at least, this skirmish looks like hundreds of others that have gone through the courts.

THE point at issue there was whether du Pont, which admittedly sold an average of 75 per cent of all cellophane produced between 1923 and 1947, had a monopoly on the stuff. The Supreme Court ruled that cellophane competes with all kinds of wrapping materials—waxed paper, aluminum foil, and plastics. Taking a broad market view, the court said du Pont controlled only 17 per cent of the total flexible wrapping business and the company got off the hook by a 4-to-3 vote.

Since Continental has diversified into glass containers and paper boxes via its acquisitions, the Justice Department thinks it is fair game for the "interchangeability" argument. In effect, however, it is arguing that because Continental management was smart enough to meet the "new competition" by diversifying, it has an "unfair advantage" over less diversified competitors.

Here again, it seems the antitrusters are baying at the moon. They are twenty-five years too late. The laws do not take into account the tremendous changes

brought about by the evolution of new marketing and organizational methods, and, perhaps even more important, the flood of new products that the nation's laboratories come up with daily.

CONTINENTAL'S reach for diversification is a logical outgrowth of conditions within the packaging industry. Twenty-five years ago, the industry's volume ran no more than \$1.9 billion a year and broke down into a rigidly distinct series of markets. Cans, cardboard and wooden boxes, paper and textile bags all tended to dominate separate areas and manufacturers had only to worry about their own little spheres of influence.

Since then, industry billings have shot to almost \$12 billion a year, and new products and marketing techniques have so broadened competition that any manufacturer who sticks to a one-product line is likely to find himself in trouble. In recognition of this fact, St. Regis Paper Company is also diversifying, and there are some indications that American Can Company, the nation's biggest can maker, is planning to do likewise.

The antitrust laws, however, have not been adjusted to changes like these.

This perhaps is the worst indictment of the antitrust laws that can be made. There have been amendments, but no changes. The law is supposed to be a living thing and while contradiction, in another context, may be a hallmark of life, in an antitrust code it argues only to sterility. The crowning contradiction is that a nation which can create an industrial machine, the like of which has never been seen, cannot also create just laws to regulate it.

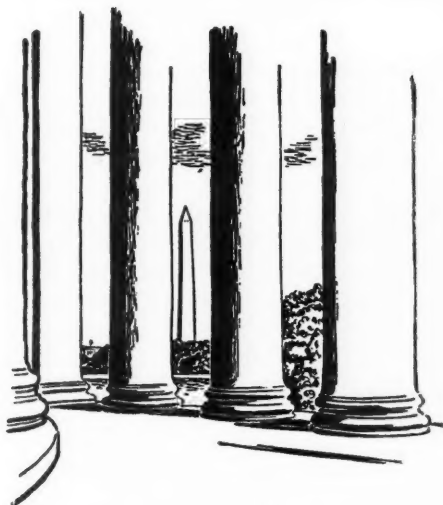
Washington and the Utilities

Ike Kicks off Push for New Gas Bill

PRESIDENT Eisenhower's Budget message to Congress on January 16th turned out to be a veritable grab bag of legislative and domestic policy proposals which have little or nothing to do with fiscal policy. The obvious reason why these items popped up in the Budget message (and some of them in the subsequent Economic Report) instead of in the State of the Union message where one ordinarily looks for them, is the administration's preoccupation with international affairs.

In his State of the Union message, the President wanted to stress the Eisenhower doctrine for the Middle East and the dedication of his second term to seeking a firmer basis for world peace. It is understandable, therefore, that, in striking such a grave tone, the Chief Executive did not want to clutter up his State of the Union message with distracting or anticlimactic references to details of domestic policy.

One of the most important details of domestic policy, of course, and certainly one without any normal relation to the usual Budget message, was the President's



call for a revival of gas legislation. Anyone interested in this perennial and twice vetoed movement to exempt independent gas producers from FPC control would do well to consider and weigh each word of the following paragraph from the Budget message:

In returning the Harris-Fulbright natural gas bill to the 84th Congress without my approval, I stated that legislation conforming to the basic objectives of that bill was needed. I am still of that opinion. It is essential that consumers of natural gas be protected. We must endeavor to make sure that there will be continued exploration and development of adequate field supplies of gas, and that producers' sales prices are arrived at fairly and competitively. In this way, and with authority vested in the FPC to regulate interstate pipelines as to the price at which gas may be charged as an item of cost in fixing their rates, the price to the public will be fair. Legislation freeing gas producers from public utility-type regulation is essential if the incentives to find and develop new supplies of gas are to be preserved and sales of gas to inter-

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state markets are not to be discouraged to the detriment of both consumers and producers, as well as the national interest.

NOTE well that while the President made an ostensibly equalized plea for protection of both producer and consumer interests, the language which followed would seem to give the producers the better part of the recommendation. Note also his observation with reference to FPC regulation was restricted to the *pipelines* and price which *they* must pay for gas. Also, note the very clear inference that gas producers should be "freed" from "public utility-type regulation."

All this was like a shot in the arm for those who were only waiting for the preliminaries of the session to subside before reviving a bill which would amount to outright exemption of producers, except under extenuating circumstances, such as favored nation "escalation clauses," etc.

It can be expected that the opposition will make a strong effort to block any outright exemption and the possibility of a compromise in favor of more liberal discretion for FPC use of field price standards is suggested. Admittedly, it could be reasonably argued that Ike really intended to reserve his approval of any bill until he could see definite protection for consumer interest. Yet it is doubtful if opponents of the bill will even bother with such fine interpretations.

Instead, they will probably show little interest in what Ike may or may not have meant, and concentrate their efforts on blocking or altering any new legislation from the consumer viewpoint, as the opponents see it. In other words, they are likely to take the position that while Ike has said what kind of a bill he is willing to sign, it is still up to Congress to decide what kind of a bill it is willing to pass. There

is where the battle will take place, and there is where the fate and shape of the bill will be determined.

WHAT about the chances of an outright exemption bill on its merits? Industry leaders have been having conferences in various places throughout the country for several months. The three segments of the gas industry—producers, pipeline operators, and distributors—are supposed to have gotten together on a tentative draft. And one explanation heard around Washington for the President's forthright endorsement is the fact that such a tentative agreement has been reached. That, of course, remains to be seen.

Prior to the President's statement there was little noticeable enthusiasm in the new Congress for a revival of gas legislation. Yet, on the other hand, the actual opposition to the passage of legislation in any form has probably not increased perceptibly, above what it was in the last Congress when the Harris-Fulbright Bill barely squeaked through the House and then sailed through the Senate by a comfortable margin only to founder on the rocks of lobby charges. And while it is true that about three dozen Congressmen who voted for the Harris-Fulbright Bill failed to return to the present Congress, no objective or realistic Washington observer would put such a vote down as the only reason why they did not return in any single instance. Nor is there any clear indication that the nearly three dozen Congressmen who replaced those who voted for the Harris-Fulbright Bill would be opposed to gas legislation to relieve the producers of at least some measure of FPC regulation.

It is probably too early to try to appraise congressional sentiment along such general lines. About the only cautious ob-

WASHINGTON AND THE UTILITIES

servation which might be made is that the proponents of a producer exemption bill are now in a position to go further and demand more than they would have expected before the President's endorsement. But if they are practical, they will also have to lay their plans with a view to some measure of compromise, especially in the House Committee on Interstate and Foreign Commerce. If they are unwilling to compromise, there is still a good chance of no legislation at all at this session of Congress, and maybe none at the next.

Ike's Other Proposals

THERE are at least eight other items to be found in the President's Budget message, supplemented by the subsequent Economic Report, which are of special significance to public utilities:

REA Interest Rates. The President clearly indicated that interest rates charged by various federal lending agencies should be raised, especially those which have a fixed statutory minimum "established when interest rates were much lower than today." This clearly applies to the REA statutory interest rate of 2 per cent a year, which is growing more unrealistic in the light of the present "tight money" situation. In the budget analysis of REA, the following blunt observation is bound to draw some stinging rejoinders from those who have always resisted all attempts to boost the 2 per cent rate on REA loans:

Interest rates are set by statute at 2 per cent, substantially below the present cost of long-term money to the Treasury of about 3½ per cent. Administrative expenses are financed by a separate appropriation. Collections of principal and interest are deposited in miscellaneous receipts of the Treasury.

Atomic Power Development. In his

analysis of the budget, the President threw basic responsibility for construction of large-scale commercial power reactors on private industry. Although the government will step up its efforts to develop the peaceful uses of atomic energy, he explained the lack of funds in the budget for new large-scale reactors as a result of his belief that responsibility for their construction "should not have to be assumed by the federal government." Only if non-federal interests fail to turn up with acceptable proposals for reactor construction will Congress be asked for funds for direct construction by the federal government.

Atomic Plant Insurance. Two supplementary bills to assist public utility companies to participate in nuclear plant development were snagged in the 84th Congress. One of these dealt with exemption from SEC control under the Holding Company Act—a situation which the SEC has itself alleviated somewhat by its recent decision exempting companies participating in the Power Reactor Development Company program. The other was a proposal for some sort of federal support or underwriting for liability insurance which commercial insurance companies are unwilling or unable to provide in connection with nuclear plant operations. President Eisenhower threw his support behind such supplementary legislation with the following statement in his Budget message:

As a further and necessary step to facilitate industry's investment in atomic power plants, legislation will again be proposed to authorize the government to supplement commercially available insurance against liability arising from possible nuclear accidents.

Niagara Power Development. The

PUBLIC UTILITIES FORTNIGHTLY

President recommended "prompt action" by Congress to break the stalemate over development of the Niagara power project. He indicated no preference for Niagara development, either by the state of New York or by private interests. He asked only that Congress decide one way or another. The exact wording of the President's brief reference on this was as follows: "I also recommend prompt action by the Congress to decide how the Niagara power project can best be developed."

PARTNERSHIP Policy. There was a re-examination of administration support for the so-called "partnership policy" for development of multipurpose projects. The President stated on this:

The program of the administration in the field of natural resources is fully set forth in that section of the budget analysis. It will not be repeated here, except to indicate my continuing firm support of the necessary legislative action to enable federal agencies to participate more fully with states, local governments, and private groups in the development of partnership resources projects. I urge once again the prompt enactment of legislation which will enable the Fryingpan-Arkansas multiple-purpose project to get under way in the fiscal year 1958.

Specific Projects. The only new project specifically endorsed by the President in his Budget message was the Fryingpan-Arkansas multipurpose proposal in Colorado which failed to be finally enacted at the last session of Congress. It will be noted that the President did not endorse certain other proposals for federal multipurpose developments, such as the John Day dam on the Columbia river and the more recent idea of a high federal dam

at the Pleasant Valley site on the Snake river. While the inference in the Budget message was that such projects should be left for local development (presumably under the "partnership policy" treatment), Secretary of Interior Seaton has more recently indicated that his department might actually intervene in opposition to, or at least to delay, the granting of an FPC license to private companies seeking an alternative development in the Pleasant Valley area.

RAILROAD Legislation. What is likely to be the forerunner of administrative recommendations to relieve railroads and other carriers of unnecessary regulation by the Interstate Commerce Commission was seen in a passage from the Budget message which urged consideration of the Hoover Report and Special Transport Advisory Committee report recommendations.

TVA Financing. Self-financing for TVA remains a goal of the Eisenhower administration. In his budget analysis, the President noted that additional generating capacity will be needed to meet TVA requirements by the end of 1960. Said the President: "Legislation is recommended to authorize the TVA, subject to regular budgetary review, to finance new generating facilities by the sale of revenue bonds." After that, and not before, TVA power requirements will be re-examined. The President's stress on "budgetary review" has already provoked reaction from TVA enthusiasts who fear that control of TVA will be taken out of the hands of the agency's three-member board of directors and placed in the hands of the Secretary of the Treasury and Budget Director. A showdown on this issue is likely to come in the present Congress.

Telephone and Telegraph



Ike's Budget

THE record budget submitted to Congress by President Eisenhower contains several items of special interest to the telephone industry. Heading the list, of course, is the appropriation requested for the Rural Electrification Administration's telephone loan program. The budget provides for new telephone loans totaling \$80 million in fiscal 1958, the same amount of loan approvals as anticipated in 1957. Attempts will probably be made in Congress, however, to boost this figure to the same amount as was actually appropriated last year (\$100 million). Administrative expenses and disbursements are expected to result in budget expenditures of \$265 million in 1958, which is \$31 million more than in 1957 and \$48 million more than in 1956.

Tucked away in the Budget message was the interesting statement that federal lending agencies would be asked to review with Congress the interest rates charged in connection with government loans. Interest on REA loans is now charged at a rate of 2 per cent. Said the President: "It is desirable that there be more consistency and that more discretion be allowed in determining what going rates should be, dependent on the period of the loans and their conditions." There was

some talk last year in Congress of bringing REA interest rates more in line with generally prevailing rates. But the proposal has always been successfully resisted by farm state representatives. If the past record is any indication, REA is likely to continue to enjoy its favored status in Congress.

Small telephone companies will welcome the relief offered by the President's proposals for aiding small business. One of these would raise the exemption of security issues from registration with the Securities and Exchange Commission from \$300,000 to \$500,000. The United States Independent Telephone Association has for years urged relief along this line, and although bills have been introduced in the past to raise the exemption from SEC registration, none has been successful. So far, one bill has been introduced in the present Congress to amend § 3 (b) of the Securities Act of 1933 to permit exemption of security issues not exceeding \$500,000 from the provisions of the act. The bill, S 810, was introduced by Senator Thye (Republican, Minnesota).

THE importance of this proposal to small telephone companies has often been outlined by USITA witnesses appearing before congressional committees.

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It has been pointed out that the increasing demand for telephone service requires telephone companies to issue securities more frequently than many other businesses in order to raise the necessary capital for expansion. Furthermore, the expense of SEC registration weighs heavily on small telephone companies which are not in a position to absorb the costs as readily as larger companies. A final argument used by USITA is that SEC registration is unnecessary, in view of the fact that telephone company securities already are regulated by the state regulatory commissions.

Telephone companies will also be watching proposals to extend minimum wage coverage. The President gave general support in his Budget message to a measure that would extend coverage and renewed his support at a meeting with labor union officials. Joseph Bierne, head of the Communications Workers of America, was among those union leaders who met with the President. The unions are seeking extension of coverage to about 9.6 million more workers and a boost in the minimum wage from \$1 to \$1.25. Although numerous bills have been introduced to raise the minimum wage, the administration is not likely to back such a proposal. It is apparent, also, that the unions are more interested in extended coverage than in raising the wage at this time. There was no indication that the union leaders requested administration support for elimination of the present exemption in the Fair Labor Standards Act regarding operators' wages at exchanges of less than 750 stations.

Bell System Heads for New Record

THE Bell system installed more than 750,000 telephones in the third quar-

ter this year, a new record exceeding the previous high of 740,000 telephones added in the third quarter of 1946. So far this year, the Bell system's gain in new telephones exceeds 2.3 million units, compared with 1,973,063 in the like period in 1955. The information was contained in the first quarterly report to American Telephone and Telegraph Company shareholders. Frederick R. Kappel, president of AT&T, predicted a very busy future for the Bell system, noting that in addition to the new highs in telephone installations, the volume of long-distance telephone business continues to grow with further increases in prospect.

For the quarter ended September 30, 1956, AT&T reported a net income of \$152,370,000 after charges and income taxes, equal to \$2.70 a share on 56,466,000 average number of capital shares outstanding during the period. This compares with a net income of \$139,236,386, equal to \$2.74 a share on 50,840,498 average shares in the September quarter of 1955. For the twelve months ended September 30, 1956, net income was \$597,440,000, or \$10.94 a share on 54,589,000 average shares, compared with \$527,931,648 or \$10.61 a share on 49,737,750 average shares in the twelve months ended September 30, 1955. These results include earnings of subsidiaries only to the extent that they have been received by the company as dividends.

In the course of paying its latest dividend of more than \$128 million, AT&T came up with some interesting statistics regarding its 1,435,000 shareholders. The company's figures show that 41 per cent of its stockholders own 10 shares or less, and that 65,000 investors only hold one share apiece. No single individual, according to estimates, owns as much as one-thirtieth of one per cent of AT&T's outstanding stock.

Financial News and Comment

By OWEN ELY



Cost Factors in the Atomic Energy Program

THE fight by government power proponents to secure a bigger foothold in the construction of atomic reactors will doubtless be renewed in Congress shortly. While some Democrats want to spend \$400 million or more on new atomic power plants (in addition to the present program), the commission has proposed a much smaller program which it is estimated might cost about \$160 million, mainly for experimental purposes. In addition to the various types of reactors now being built or projected by utility groups, the commission would like to try out five new types—a heavy-water natural uranium reactor of 100,000 kilowatts or more, an aqueous-homogeneous reactor of about the same size, and three smaller reactors of other types. The AEC would prefer to have private industry take over these proj-

ects, if possible. It would advance increased funds to private industry for research and development expense, thus in effect partially subsidizing some of the projects. It would also liberalize its policy of selling nuclear fuels and nuclear fuel elements.

AEC Chairman Lewis L. Strauss recently invited public and private power groups to submit plans for constructing these additional reactors. This is the third general invitation issued by the commission in recent years. While there is no deadline for submitting proposals, all plants must be scheduled for completion by the middle of 1962. The commission is particularly interested in new-type reactors which can be fueled with natural uranium, or plants using a liquid fuel. A reactor using natural uranium is said to be favored by Congress because of its probable appeal to foreign users, since the fuel supply would be much cheaper and might be available locally. Out of seven recent proposals for small power reactors, two have been dropped, including a 12,600-kilowatt plant at Holyoke, Massachusetts, and a 25-40,000-kilowatt reactor proposed by the city of Orlando, Florida.

THE new AEC proposals seem to reflect a modest concession by the administration to meet the renewed threat of

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the Gore Bill. Unfortunately, neither the AEC nor Congress has yet come to grips with the major problem which is holding back the utilities from speeding up their programs: the need for \$500 million federal disaster insurance, to supplement the \$70 million private insurance program, covering each reactor. Unfortunately the bill to provide this died in the last Congress and it is understood that the Democrats now propose to tie the insurance plan into a new version of the Gore Bill. However, the AEC is said to be working on a separate bill. The Joint Atomic Energy Committee of Congress is expected to begin hearings on the progress of civilian power development about February 18th.

The major construction program now looks about as shown in the table below, according to *Business Week*.

The Michigan project, sponsored by a large group headed by Detroit Edison (PRDC) has been delayed by the labor union attack on the project, claiming that it is unsafe. The AEC is currently holding hearings on the issue and experts are testifying on both sides. With local residents around Monroe, Michigan, apparently unconcerned about any possible danger from the project when completed, it is hard to believe that the unions are activated purely by humanitarian motives.

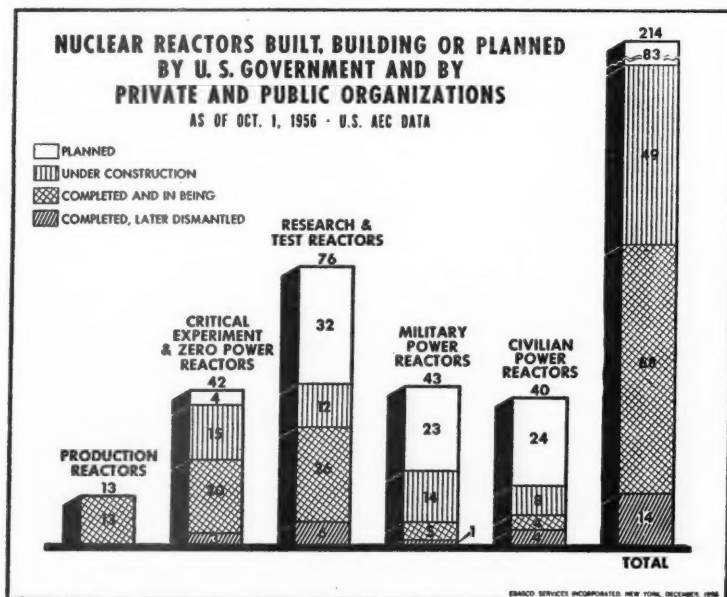
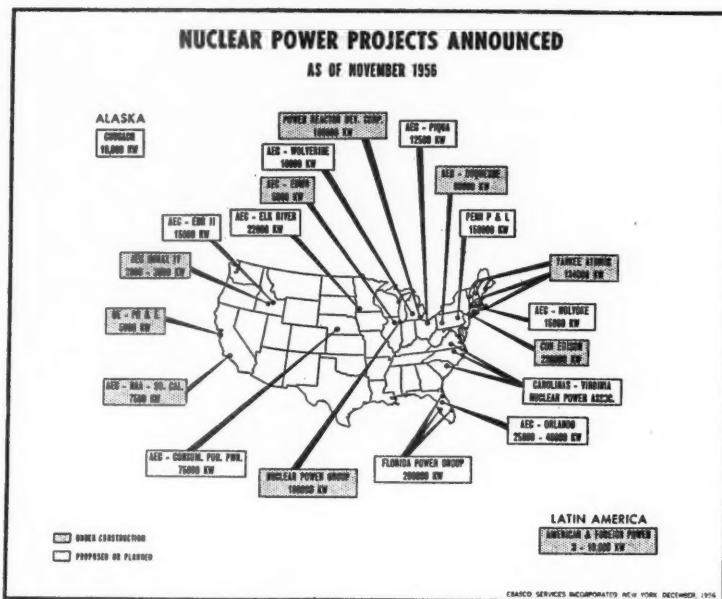
H. F. BROWER, assistant vice president of Consolidated Edison of New York, in explaining why his company is moving ahead with its atomic power proj-

ect at Indian Point, has stated that while the cost of fossil fuel—coal, oil, and gas—is steadily rising, the cost of operating a nuclear plant is expected to decline as experience permits new economies. The complete plant, including the superheater, will cost about \$55 million and have an over-all capacity of some 236,000 kilowatts. As well as improving the efficiency, the superheater will reduce the over-all cost of the plant from \$320 to \$235 per kilowatt. About one-third of the cost will be for the reactor, including the first core. With minor changes in design it is thought that capacity could be increased to 275,000 kilowatts, which would reduce cost per kilowatt to \$200, about the cost of a conventional generating plant.

The question as to when atomic power can become competitive with fuel-generated electricity in cost of production does not attract much attention in Congress, since government power advocates are more interested in the billions they can pry out of the Treasury than in analyzing kilowatt construction costs or kilowatt-hour production costs. Commonwealth Edison claims that its big Illinois reactor should be able to produce electricity at about 7½ mills per kilowatt-hour, which would be competitive with new coal-burning plants in the area, but this claim has never received much official recognition by the AEC. Commonwealth's average "operating cost" for all steam plants in 1955 (including some old plants) was 4.6 mills per kilowatt-hour, but the addition of de-



Completion Target	Project	Millions of Kilowatts	
		Plant Capacity	Cumulative U. S. Capacity
1957	Duquesne Light	65	65
1959	Consumers Public Power District	75	140
1960	Consolidated Edison	236	376
"	Commonwealth Edison	180	
"	Detroit Edison	100	
"	Yankee Atomic Electric	134	790
1962	Pennsylvania P. & L.	150	
"	Florida Group	200	1,140



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preciation, taxes, and capital costs would raise this to 8 mills or more, we estimate.

DESPITE use of a superheater to produce part of the power, Consolidated Edison estimates full production costs at about 9 mills per kilowatt-hour for its Indian Point reactor plant. This would compare with a little over 7 mills for Arthur Kill No. 2, a fuel-burning plant of comparable size. The accompanying charts (see page 261) prepared by Consolidated Edison show estimated annual production costs in millions of dollars for the nuclear plant (Indian Point) and for a projected fuel-burning plant (Arthur Kill No. 2). The figures are also worked out on a kilowatt-hour basis for different load factors. Construction costs and the resulting fixed charges are only moderately higher for the atomic reactor, but operating costs in mills show a larger differential:

	<i>Nuclear Plant</i>	<i>Fuel-burning Plant</i>
Operating Cost Per Kwh. . .	5.1	3.8
Fixed Charges Per Kwh. . .	4.0	3.4
Total	9.1	7.2

Mr. Brower stated that if 275,000-kilowatt capacity could be realized at the atomic plant, the fixed charge component of cost would closely coincide with that of the Arthur Kill No. 2 type of equipment. "The burn-up or life of the core is conservatively estimated," he said. "There is likewise a good possibility that the core life can be extended, utilizing in place a larger percentage of the U 235 and U 233 produced in the reactor and if this longer life can be obtained, the operating cost component of the total will be reduced."

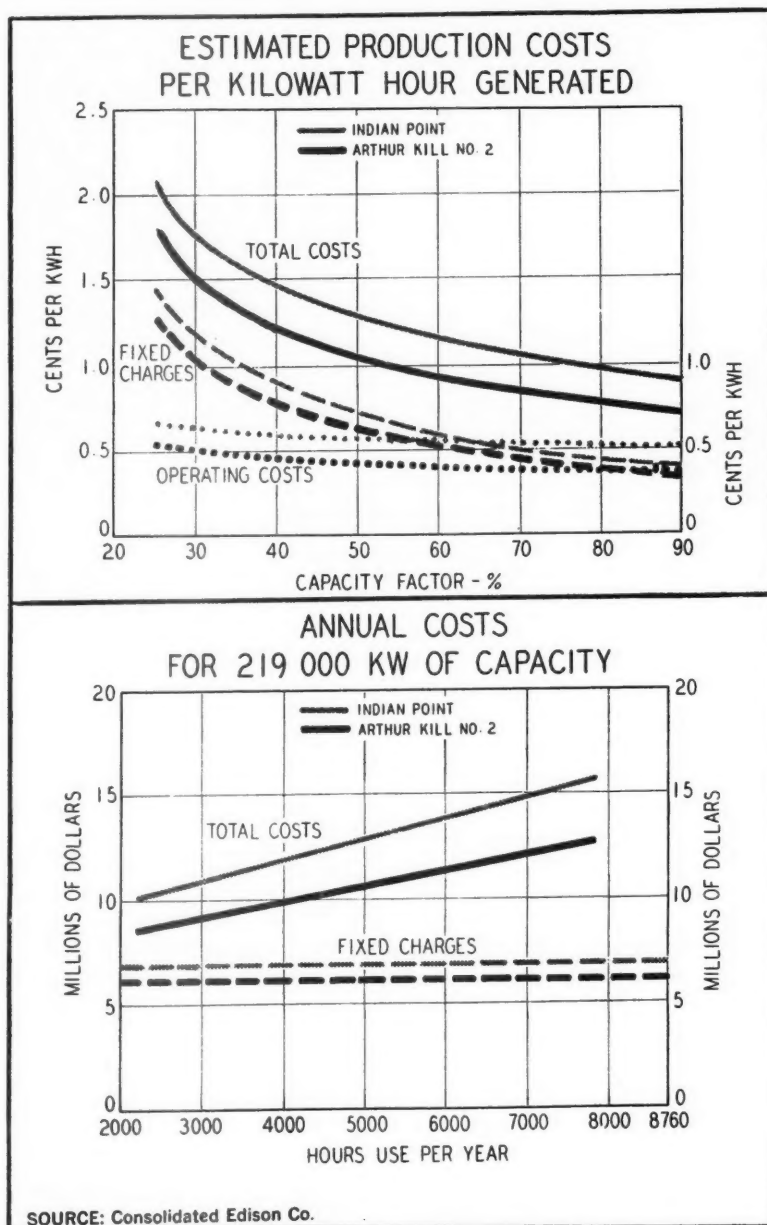
How are currently planned private nuclear power plants being financed? Consolidated Edison will construct its plant as part of its general over-all construction program, with the usual finan-

cial methods. Commonwealth Edison will doubtless do the same, except that one-third (\$15 million) of the plant cost will be paid as a research and development cost by Edison and seven associates. Edison's portion will be \$2,833,334, which will be charged to expenses over a five-year period.

Yankee Atomic Power thus far has raised about \$2 million capital, 50 per cent in stock and 50 per cent in notes, all being owned by New England Electric System and eleven other New England utilities. The cost estimate was originally \$35 million but it is understood that this is being reappraised. The AEC will probably contribute some \$4-5 million. It is reported that, when the company sets up its complete capital structure, there will be a substantial equity ratio, with a minimum of 30-35 per cent.

The Michigan reactor, projected by Power Reactor Development Company (sponsored by Detroit Edison and eleven other utilities, one utility service company, and seven industrial companies), is scheduled to cost about \$45 million, with research help from the AEC. The financial setup is not too clear at this time, but it is thought that members of PRDC and APDA will contribute about \$30 million, with loans from five New York banks accounting for \$15 million or more. Here again there should be a substantial common stock equity. It seems obvious that the utility companies do not plan to try to finance these plants with the extremely low equity ratios used in the cases of EEI and OVEC.

GREAT BRITAIN, alarmed by declining coal production and loss of mid-western oil due to the Suez adventure, is reported raising its sights on its atomic reactor program. The objective by 1965, according to *Business Week*, may now be



PUBLIC UTILITIES FORTNIGHTLY

16-19 power stations *versus* 12 under the old program, with a total expenditure of around \$1.75 billion or over, double the original amount. Total capacity might then approximate 7 million kilowatts. The new Ministry of Power, headed by Sir Percy Mills, has been given authority over steel production, presumably to obtain priorities for construction of atomic power plants. Other foreign countries are also active in ordering experimental reactors and in exploring the possibilities of building commercial-size reactors.

Meanwhile, scientists continue to issue exciting bulletins over theoretical possibilities of obtaining enormous amounts of heat and power from nonpoisonous hydrogen fusion, rather than from the poisonous fission of uranium in reactors.

Higher Fuel Costs as a Factor In Electric Utility Earnings

THE increase in fuel costs has become a serious factor in electric utility earnings in certain areas such as California. In the twelve months ended September 30th, fuel costs as reported by the FPC for major electric utilities increased 13.5 per cent over the previous year compared with a gain in revenues of only 9.4 per cent. In the month of November the increase in fuel cost was 12.4 per cent compared with a 6.8 per cent gain in revenues. The increase in revenues reflected whatever was obtained in the way of offsets to higher fuel costs through the operation of fuel adjustment clauses.

Despite higher fuel costs net income continued to make a good monthly showing during 1956 as compared with the previous year until October, when the gain over 1955 dropped to 1.2 per cent. In November there was a decrease of 0.2 per

cent in net income, according to the preliminary press release.

The major effects of increases in oil and gas prices are perhaps being felt in California, where Southern California Edison is asking for a substantial rate increase (following one obtained about two years earlier) and Pacific Gas and Electric is requesting a more flexible fuel adjustment clause. Oil prices were raised about 25 per cent late in November, it is understood, and the wholesale cost of gas has also been in a gradual uptrend. Higher gas costs have a double-barreled effect on earnings where a utility serves gas to its customers and also uses it as boiler fuel to generate electricity.

The utility companies in Florida are fortunate in having escalator clauses in their electric rate schedules which substantially offset higher fuel costs. This is the only assured way to guard against (1) regulatory lag, and (2) adverse political and regulatory developments which may deny a fair rate of return after an increase has been requested.

SOME utilities throughout the country are protected against higher fuel costs on industrial business (where rates are low) and some are also safeguarded on commercial and residential rates. It appears likely that unless present inflationary trends are halted, we may be in for another series of rate increase applications. In preparing these cases the utilities should seek to broaden the coverage of fuel adjustment clauses. This is not only fair to the utilities but may save the commissions a large amount of time and expense in future rate litigation.

The above does not necessarily indicate a pessimistic outlook for electric utility share earnings for 1957. Based on our own inquiries and other reports, a considerable majority of the electric utilities expect

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share earnings to continue to gain this year, and some of the so-called "growth" utilities will continue to make an excellent showing. However, these continued gains in many cases will probably be due more to anticipated reduction of equity financing than any other factor. (This factor is much more important than the effects of higher interest rates on new bond issues.) In past years gains in net income were frequently reduced or wiped out by equity financing. In 1956 (as noted in the last issue of this department) there was a considerable decline in the proportion of equity financing by electric and gas utilities and this trend may be expected to continue this year, due largely to the increasing cash flow from tax savings resulting from the application of accelerated depreciation.

ANOTHER reason for lower equity financing is the fact that many utilities have now reached, or exceeded in some cases, their goals with respect to equity ratios. The flexibility of the equity ratio is an "anchor to windward" for many utility companies. Another advantage is the present substantial reserve capacity which would permit construction and new financing to be curtailed sharply in the event of a real depression. But thus far there has been no indication that the utilities anticipate such a depression since their construction plans have not been curtailed. In Texas, from present indications, planned construction expenditures appear to be larger than those of recent years—except for Southwestern Public Service, which has nearly 40 per cent reserve capacity.



RECENT FINANCIAL DATA ON GAS UTILITY STOCKS

Rev. (Mill.)		1/24/57 Price About	Divi- dend Rate	Approx. Yield	Recent Share Earnings	% In- crease	Aver. Incr. In Sh. Earnings 1951-55	Price- Earnings Ratio	Div. Pay- out	Approx. Common Stock Equity
<i>Pipelines</i>										
\$ 4	O	Ala.-Tenn. Nat. Gas	21	\$1.20	5.7%	\$1.45Se	13%	17	14.5	83% 37%
15	O	Commonwealth N. G. ...	32	1.60	5.0	2.72Se	7	X	11.8	59 37
16	O	E. Tenn. Nat. Gas	9½	.60	6.3	.82Se	46	X	11.6	73 18
48	S	Miss. River Fuel	37	1.60	4.3	2.17Se	16	6	17.1	74 52
69	S	Southern Nat. Gas	41	2.00	4.9	2.70Se	25	3	15.2	74 33
200	O	Tenn. Gas Trans.	31	1.40	4.5	1.91Se	21	17	16.2	73 22
163	O	Texas East. Trans.	26	1.40	5.4	2.12Se	12	5	12.3	66 23
71	O	Texas Gas Trans.	22	1.00	4.5	2.21Se	31	D	10.0	45 27
75	O	Transcont. Gas P. L. ...	18½	1.00	5.4	1.28Se	18	17	14.5	78 19
Averages				5.1%				13.7	69%	
<i>Integrated Companies</i>										
127	S	American Nat. Gas	63	\$2.60	4.1%	\$4.50N	NC	8	14.0	58% 35%
50	A	Arkansas-Louis. Gas ...	24	1.20(j)	5.0	1.50Oc	NC	10	16.0	80 53
44	O	Colo. Interstate Gas	78	1.25	1.6	5.28Se	NC	45	14.8	24 35
304	S	Columbia Gas System ..	17	1.00	5.9	1.52Se	38%	3	11.2	66 44
8	O	Commonwealth Gas	7	.10	1.4	.26#	D51	D	—	38 72
10	A	Consol. Gas Util.	16	.90	5.6	1.83Jy	87	D	8.7	49 53
240	S	Consol. Nat. Gas	41	1.90	4.6	3.26Se	21	O	12.6	58 70
178	S	El Paso Nat. Gas	33	1.30	3.9	2.12De	48	O	15.6	61 22
40	S	Equitable Gas	30	1.60	5.3	2.31Se	20	4	13.0	69 32
15	O	Kansas-Nebr. Nat. Gas ..	35	1.65	4.7	2.63Se	30	3	13.3	63 32
88	S	Lone Star Gas	34	1.80	5.3	2.35Se	11	5	14.5	77 39
23	S	Montana-Dakota Util. ..	25	1.00	4.0	1.51Se	11	25	16.6	66 30
21	O	Mountain Fuel Supply ..	26	1.20	4.6	1.65Se	9	8	15.8	73 59
72	S	National Fuel Gas	19	1.10	5.8	1.66Se	6	8	11.4	66 58
108	S	Northern Nat. Gas	55	2.20	4.0	3.50Se	11	26	15.7	63 34
43	S	Oklahoma Nat. Gas	28	1.50	5.4	2.00N	6	6	14.0	75 29
99	S	Panhandle E. P. L.	53	1.50	2.8	2.50De	18	16	21.2	60 32
11	O	Pennsylvania Gas	23	1.00	4.3	1.63#	D10	D	14.1	61 68

PUBLIC UTILITIES FORTNIGHTLY

159	S	Peoples G. L. & Coke ...	178	8.00	4.5	12.86Se	18	6	13.8	62	40
31	O	Southern Union Gas	27	1.12	4.1	1.69#	28	15	16.0	66	34
215	S	United Gas Corp.	34	1.50	4.4	2.21Se	5	7	15.4	68	41
Averages					4.3%				14.4	65%	

Retail Distributors

28	A	Alabama Gas	32	\$1.60	5.0%	\$2.36De	8%	31	13.6	68%	42%
44	O	Atlanta Gas Light	31	1.60	5.2	2.75Se	23	2	11.3	58	33
5	O	Berkshire Gas	16	.90	5.6	1.34Au	111	46	11.9	67	37
4	O	Bridgeport Gas	29	1.50	5.2	2.57Se	22	48**	11.3	58	44
4	O	Brockton-Taunton Gas ..	17	.90	5.3	.85#	30	42	20.0	106	36
55	S	Brooklyn Union Gas	35	2.00	5.7	2.83De	5	5	12.4	71	47
1	O	Cascade Nat. Gas	10	—	—	Def.#	—	—	—	—	41
33	O	Central El. & Gas	17	.90	5.3	1.67Se	28	9	10.2	54	17
11	O	Central Indiana Gas	13	.80(b)	6.2	1.08Se	13	D	12.0	74	64
5	O	Chattanooga Gas	6	.30	5.0	.47Au	38	14	12.7	64	45
66	O	Gas Service	24	1.36	5.7	2.26Se	23	O	10.6	60	41
6	O	Hartford Gas	37	2.00	5.4	2.50Ma	15	D	14.8	80	52
2	O	Haverhill Gas	20	1.20	6.0	1.87N	46	14	10.7	64	55
31	O	Houston Nat. Gas	38	1.50	3.9	2.26Jy	24	6	16.8	66	22
16	O	Indiana G. & Water	20	1.00(k)	5.0	1.58N	16	9	12.7	63	47
45	S	Laclede Gas	15	.80	5.3	1.21Se	25	2	12.4	66	34
4	O	Michigan Gas Utils.	21	1.00	4.8	1.31#	5	14	16.0	76	43
4	O	MidSouth Gas	13	.60	4.6	.72#	71	D	18.1	83	34
37	O	Minneapolis Gas	27	1.40	5.2	2.27Se	43	10	11.9	62	38
14	O	Miss. Valley Gas	20	1.12(d)	5.6	1.92Se	14	—	10.4	58	28
5	O	Mobile Gas Service	22	1.00	4.5	1.23Se	D20	D	17.9	81	33
7	O	New Haven Gas	30	1.60	5.3	2.39#	7	17	12.6	67	63
12	O	New Jersey Nat. Gas ...	25	1.20(i)	4.8	2.23De	17	—	11.2	54	32
70	O	No. Illinois Gas	18	.88	4.9	1.48N	33	—	12.2	59	49
8	O	North Penn Gas	13	1.00	7.7	.83#	D33	1	15.7	120	57
6	O	North Shore Gas	16	.80	5.0	1.28Je	4	6	12.5	63	53
183	S	Pacific Lighting	37	2.00	5.4	2.90Se	7	33	12.8	69	44
15	O	Pioneer Nat. Gas	29	1.32	4.6	1.89Je	NC	19	15.3	72	53
13	O	Portland Gas & Coke	32	1.00	3.1	2.38De	6	9	13.4	42	40
2	O	Portland Gas Light	10	.75	7.5	1.22#	13	—	8.2	61	25
8	A	Providence Gas	9½	.56	5.9	.59#	16	16	16.1	95	64
3	A	Rio Grande Valley Gas ..	3	.15	5.0	.26Je	—	9	11.5	58	63
3	O	So. Atlantic Gas	13	.80	6.1	.89#	12	D	14.6	90	35
9	O	South Jersey Gas	26	1.40	5.4	2.12N	30	23	12.3	66	52
24	S	United Gas Impr.	37	2.00	5.4	2.41Se	16	D	15.4	83	64
33	S	Wash. Gas Light	38	2.00	5.3	3.48Se	31	4	10.9	57	42
8	O	Wash. Nat. Gas	15	.40	2.7	.34Se	D33	—	—	117	67
6	O	Western Ky. Gas	15	.60	4.0	1.24Ma	NC	29	12.1	48	35
Averages					5.1%				13.2	69%	



RECENT FINANCIAL DATA ON TELEPHONE, TRANSIT, AND WATER STOCKS

Rev. (Mill.)			1/24/57 Price About	Divi- dend Rate	Approx. Yield	Recent Share Earnings	% In- crease	Aver. Incr. In Sh. Earnings 1951-55	Price- Earnings Ratio	Div. Pay- out	Approx. Common Stock Equity
Communications Companies											
Bell System											
\$5,297	S	Amer. T. & T. (Cons.) .	175	\$9.00	5.1%	\$13.13N*	1%	3	13.3	69%	64%
245	A	Bell Tel. of Canada ...	48	2.00	4.2	2.43#*	—	3	19.8	82	63
40	O	Cin. & Sub. Bell Tel. ..	86	4.50	5.2	5.45#	6	5	15.8	83	100
187	A	Mountain Sts. T. & T. ..	124	6.60	5.3	8.71Au	2	10	14.2	76	78
308	A	New England T. & T. ..	133	8.00	6.0	9.01De	—	6	14.8	89	60
715	S	Pacific T. & T.	128	7.00	5.5	8.32N	D4	5	15.4	84	58
98	O	So. New Eng. Tel.	39	2.00	5.1	2.22De	15	1	17.6	90	64
Averages					5.2%				15.8	82%	

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Independents

4	O	Anglo-Canadian Tel.	33	\$.60	1.8%	\$1.76Se	NC	19	18.8	34%	48%
33	O	British Col. Tel.	44	2.00	4.5	3.32Se	6%	22	13.3	60	28
2	O	Calif. Inter. Tel.	11	.70	6.4	.87Se	D17	—	12.6	80	30
13	O	Calif. Water & Tel.	20	1.20	6.0	1.46#	20	11	13.7	82	42
14	O	Central Telephone	20	1.00	5.0	2.15Se	13	14	9.3	47	25
3	O	Commonwealth Tel.	14½	.80	5.5	1.31#	27	26c	11.1	61	32
3	O	Florida Telephone	18	.80	4.4	.88#	10	D	20.5	91	40
210	S	General Telephone	41	1.80	4.4	3.03Oc	NC	31	13.5	59	34
15	O	Hawaiian Telephone	18	1.00	5.6	1.37De**	D1	19	13.0	73	47
5	O	Inter-Mountain Tel.	14	.80	5.7	.94Je	—	10	14.9	85	55
19	S	Peninsular Tel.	41	1.80	4.4	2.05Se	D10	5	20.0	88	46
19	O	Rochester Tel.	18	1.00	5.6	1.75Oc	NC	4	10.3	57	34
3	O	Southeastern Tel.	15	.90	6.0	1.36Se	43	13	11.0	66	42
8	O	Southwestern St. Tel.	18	1.12	6.2	1.48Je	36	1	12.2	76	42
28	O	United Utilities	20	1.20	6.0	1.43Se	D13	8	14.0	84	31
12	O	West Coast Tel.	18	1.00	5.6	1.24Se	2	25	14.5	81	43
242	S	Western Union Tel.	19	1.00	5.3	2.10#	39	19	9.0	48	85
Averages					5.2%				13.6	70%	

Transit Companies

22	O	Baltimore Transit	10	\$1.60	16.0%	\$1.27#	120%	X	7.9	126%	40%
13	O	Cincinnati Transit	4½	.30	6.7	.34#	16	—	13.2	88	43
9	O	Dallas Transit	5	.35	7.0	.57#	D48	D	8.8	61	51
31	S	Fifth Ave. Coach Lines ..	29	2.00	6.9	2.85#	D3	O	10.2	70	100
225	S	Greyhound Corp.	15	1.00	6.7	1.15Se	D11	D	13.0	87	52
21	O	Los Angeles Transit	16	1.40	8.8	.94#	D5	5	17.0	149	89
27	S	Nat. City Lines	21	2.00	9.5	2.74#	D1	11	7.7	73	93
13	O	Niagara Frontier Trans. ..	8½	.15	1.8	1.47#	—	14	5.8	10	78
70	O	Phila. Transit	9	.30	3.3	1.27#	390	D	7.1	24	42
6	O	Rochester Transit	5	.40	8.0	.43#	D2	D	11.6	93	40
23	O	St. Louis P. S.	12½	1.40	11.2	.68#	D15	28	18.4	206	91
16	S	Twin City R. T.	17	1.80	10.6	Def.#	—	D	—	—	41
22	O	United Transit	5	.60	12.0	1.03#	94	36	4.9	58	48
Averages					8.3%				10.5	87%	

Water Companies

Holding Companies

34	S	American Water Wks. ..	9	\$.50	5.6%	\$1.04Se	10%	6	8.7	48%	16%
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Operating Companies

4	O	Bridgeport Hydraulic ..	31	\$1.60	5.2%	\$2.04#	12%	4	15.7	78%	57%
11	O	Calif. Water Service	39	2.20	5.6	2.88N	10	O	13.5	76	29
3	O	Elizabethtown Water ...	38	1.00	2.6	3.01Ap	NC	36	12.6	33	56
9	S	Hackensack Water	41	2.00	4.9	3.60#	10	11	11.4	56	37
8	O	Indianapolis Water A ..	19	.37	2.0	1.59#	27	27	11.7	23	33
5	O	Jamaica Water	32	2.00	6.3	2.94Se	—	10	10.9	68	25
4	O	New Haven Water	59	3.00	5.1	3.32#	D3	4	17.8	90	63
2	O	Ohio Water Service	25	1.50	6.0	2.74Se	42	5	9.1	55	38
7	O	Phila. & Sub. Water ...	29	.50(e)	1.7	2.20#	11	D	13.2	23	29
2	O	Plainfield Un. Water ...	67	3.00	4.5	5.47#	37	8	12.2	55	40
3	O	San Jose Water	45	2.00	4.4	3.52Se	3	10	12.8	57	43
9	O	Scranton-Springbrook ..	17	.90	5.3	1.44Se	10	8	11.8	63	29
4	O	Southern Calif. Water ..	14	.80	5.7	1.08Je	4	8	13.0	74	34
3	O	West Va. Water Service	22	1.40	6.4	1.85Se	41	1	11.9	76	17
Averages					4.7%				12.7	60%	

A—American Stock Exchange. O—Over-counter or out-of-town exchange. S—New York Stock Exchange. #—Year ended December, 1955. Ja—January; F—February; Ma—March; Ap—April; My—May; Je—June; Jy—July; Au—August; Se—September; Oc—October; N—November; De—December, (b)—Paid 10 per cent stock dividend. (c)—1952-55. (d)—Paid 25 per cent stock dividend. (e)—Also paid 5 per cent stock dividend. (h)—Paid 25 per cent stock dividend. (i)—Paid 2 per cent stock dividend. (j)—Paid 10 per cent stock dividend. (k)—Paid 3 per cent stock dividend. NC—Not comparable. NA—Not available. D—Decrease. X—Deficit in 1951. *On average shares. **1951 was an abnormally bad year.



What Others Think

Education for Engineers

THE urgent need of business today is for "three-dimensional" engineers and business itself can do much to help develop them. This was the theme of a recent address by Frederick R. Kappel, president of American Telephone and Telegraph Company. Kappel was speaking before the winter general meeting of the American Institute of Electrical Engineers in New York.

In this dynamic and expanding world the competent engineer has to lead a dynamic and expanding life, Kappel said. "In my judgment there is simply no room left for any routine approaches to engineering, or for standing still with the mental equipment we've got. The engineer has to grow and change with the times, and constantly equip himself to handle new problems. He has to nourish his mind and broaden his outlook to make sure that neither gets obsolete. At all times, he has to look ahead."

Creative imagination, ability to take on new assignments, and selective judgment constitute the necessary equipment of today's engineer and Kappel believes the growing tendency in the schools to concentrate on fundamentals is helpful in developing these qualities. But it remains to industry, he stated, "the great responsibility to provide not only first-rate technical training but also to make sure the

able engineer never gets locked in his technical closet.

"To be sure, he always remains an engineer, with a sound grasp of engineering fundamentals that never grow obsolete. But he also becomes something more. As he applies ever-changing arts he is also thoughtful of their effects. He gains and uses knowledge of marketing and finance. He interprets between designer and salesman. He perceives and understands the general wants and particular problems of other people, whether he holds a supervisory position or not."

REWARDS in money and in sense of accomplishment will be ample for such engineers, Kappel said, and, for people of ability, who have a real proprietary interest in the business they are engaged in, and want to make their interest effective, in action, industry must certainly provide full opportunity for education and growth.

As an illustration, Kappel outlined some of the educational activities organized by Western Electric, Bell Telephone Laboratories, and the operating telephone companies.

The Communications Development Training Program at the laboratories is well known. It began in 1948 in response to the need to prepare graduate engineers for research and development work. The

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program extends over three years with about half the time in classroom work. More than a hundred men enter the program each year.

Starting in 1956 a small number of CDT students are being awarded fellowships to allow them to study for their doctorates. While doing this they continue as employees at full salary.

About 140 professional members of the laboratories are doing graduate work at nearby universities during part of their working hours, with tuition refunded by the laboratories. For technical aides and also for engineers, the laboratories also conduct numerous out-of-hour courses. Participation is voluntary, Kappel said, and some 1,500 registrations are expected this year. In addition a monthly lecture program has an average attendance of about 700.

THE operating companies of the Bell system are also moving to broaden their training. Several of the companies have organized specific courses for engineers of from one to twelve weeks. One course, for instance, relates engineering to the over-all activity of the company. Another is on transmission. Others cover tariffs and rates, technical writing, the work of other engineering groups in the company, reasons behind the operations of other branches of the business, and so on.

Last September about fifty graduate engineers of the operating companies began twenty-two months of class work and study at Bell Laboratories to get a basic understanding of new telephone art, including electronic switching. "We are just at the beginning of a gradual transformation of the Bell system's physical plant," said Kappel. "In each company we shall have to have engineers who will take leadership in effecting this physical

transformation, and also in training other engineers. This is the first step in a continuing program to that end.

By late summer Western Electric will have three study centers, in New York, Chicago, and Winston-Salem, Kappel revealed. Here both new and experienced engineering employees will be enrolled. New engineers, after their first four to six months with the company, will take a series of introductory courses to help them move into a full assignment. After a year's service they will have ten weeks more of study and discussion, not only on technical subjects but also in dealing with people. For experienced engineers there will be a wide variety of advanced courses. In addition, Western Electric now operates a plan to encourage employees to study on their own time at accredited colleges. The company will refund up to \$250 a year tuition to any employee, part on enrollment and the rest on successful completion of courses which the company feels are related to the employee's present job, or to a job he might reasonably aspire to hold.

Throughout the Bell system engineers are also participating fully in management development programs, Kappel said. He continued:

When we started our executive conference at Asbury Park two and a half years ago we had several ideas in mind. We wanted to bring telephone management people and top-flight men in other fields together for discussion and case study, and let the sparks fly. We wanted the least teaching in the sense of prescribing, and the most learning through one's own thinking. We hoped too that the Asbury Park idea would spread all through the Bell system at different levels of management.

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All these things are taking place. And we shall encourage them more, not less. Indeed, we must.

OVER the next ten years Kappel foresees that more than 80,000 Bell system people—engineers included—will be moving into new positions in management.

"In the same ten years we shall be going a long, long way in the transformation of our physical telephone system. New art and new applications will bring new convenience in service and new forms of service. In fact we expect the time is coming when we'll be able to communicate anything you want in just about any way you want, and over any distance, long or short. With people changing, management changing, technology changing, and service changing, it is unthinkable not to use every means in our power to improve our competence and at the same time our understanding of the world around us and our place in it."

Kappel believes the Bell system's need for engineers of ability and imagination is typical. But he warned that the need will not be satisfied just tagging or labeling people as engineers. "We won't do it by putting engineers into compartments and shutting them off from the rest of the ship. We won't do it by cramming size 42 men into size 36 jobs, or vice versa. We won't do it by setting so-called minimum standards and then sitting back and letting nature take its course." He continued:

We *will* do it I believe through intelligent and concerted effort to develop what I call three-dimensional engineers.

The first dimension we'll say is what you got in college, that showed you how to move in a straight line in your first particular field.

The second dimension is in continued

training and self-study, that broadens a man—or a woman—and keeps him up to date with technological changes so he can solve problems in broad areas and new areas of engineering.

The third dimension is the height that comes from the mixing and mingling of engineering and management ideas, so that the engineer's understanding of the problems and requirements of the business makes him more effective in the business. This understanding comes not only from study but from shoulder-to-shoulder association and contact and interaction between engineering, operating, financial, and merchandising people. And we need this third dimension not here and there among engineers but everywhere—so they will have a volume effect on the business. If engineering is to be solid, it's got to have this volume.

INDUSTRY can contribute much, especially to the second and third dimensions, Kappel said. "Right now in our business, because of the effort we're making in these directions, we're getting a wonderful amount of fine engineering work done that otherwise could never have been done so soon or so well. More than that, with a wider appreciation by other people in management of the engineer's contribution, I'm confident we're getting a better team and a better over-all job. And I am equally confident that our engineers are profiting in prestige, promotion, and salary rewards as a result.

"As the need for technology increases further—and it surely will—it seems to me inevitable that the need for engineers in management, including top management, will likewise continue to increase. I don't see how it can be otherwise. What this means is simply that engineers must grow, and of course it is they themselves

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who must do the growing. No one else can do it for them. The training and education I've been talking about are essential, all right, but what they add up to in the end is only the soil to grow in.

"... As I see it, the challenge to engineers today is that they should deliberately work to fill out all the height, all the depth, and all the breadth they can reach. Along with this, industry is equally challenged to give able engineers full opportunity to live and work and think and create in all three dimensions. For this is the kind of engineering influence and leadership we need, and I have great faith we shall get it, to the further advantage of our country and the world."

A POSSIBLE stumbling block in the path of developing the kind of engineers Kappel has in mind was pointed out in an address by M. S. Coover, president of the American Institute of Electrical Engineers.

He called the gap between high-school training and college entrance requirements in this country "acute and tragic. It seems incredible that we can think of continuing to have a well-integrated educational system in America without taking immediate steps" to reduce this gap, he said.

Coover called for a fundamental revision in all curriculums in science and engineering, particularly at the undergraduate level in our colleges and universities, involving elimination of vocational types of courses which belong to technician training programs.

Citing the immense progress that has been made in engineering and science and the increased need for higher competence of graduates in these two fields, Coover said:

It becomes imperative that methods be developed whereby these high levels

of competence can be reached successfully. I believe that our colleges and universities realize their responsibility in this regard. One of the major obstacles is that the lure of industrial salaries, with their accompanying benefits, is rapidly depleting our colleges and universities of quality teachers. Replacement is becoming more difficult and at the same time more potential students seek admission.

Of equal concern, Coover continued, is whether adequate preparation is being made for admission into our colleges and universities. Here, too, it is possible to locate reasons for conditions that exist, he said. Economic circumstances have lured too many good high-school teachers to other employment. "Without proper guidance, particularly at home, potentially capable high-school students can drift into the more glamorous courses that are being offered currently. All too often parents leave guidance to teachers, and serious-minded, capable counselors seem to be rare. A lengthening dimension, thus, is being created between high-school terminus and college entrance requirements." Coover stated further:

We in America believe in local control in education. It can be made to work properly. Unfortunately, school administrators in some communities, acting with good intentions based on inadequate information, or yielding to pressure from those who would spare their children from the more rigorous courses in the sciences, have permitted the quality of those courses to decline or, except for mathematics, to disappear. To reverse this trend is neither easy nor inexpensive. Let me repeat that the lengthening dimension between high-school terminus and college en-

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trance requirements is acute, it is tragic, and it seems incredible that we can think of continuing to have a well-integrated educational system in America without taking immediate steps to reduce that dimension.

The need to evaluate trends in educational standards in our own communities is apparent, Coover concluded. He urged the development of a corrective program wherever needed before the burden becomes too great.

Industrial Progress Keyed to Efficient Power Use

ADVANCES in industrial research, electronic controls, industrial lighting, air conditioning, and materials handling can only come about through the more efficient uses of electricity, Fred W. McChesney of General Electric told a meeting last month of 400 industrial managers.

McChesney addressed a productivity forum held in Newark, New Jersey, last month—the one hundredth in a continuing series of such forums held in cooperation with the nation's utilities as part of General Electric's "More Power to America" program. The forum was cosponsored by Public Service Electric & Gas Company of Newark, New Jersey.

McChesney, forum chairman, said that this year more than 13.5 million workers, with 21,110 kilowatt-hours of electricity available per worker per year, are handling the nation's immense production tasks during a workweek which averages 40.3 hours. "In 1976," he said, "we estimate there will be slightly more than 15.5 million workers available, each having about 61,300 kilowatts of electricity at his disposal. The great need for utilization of the best production equipment and techniques becomes evident when we consider that the workweek then will probably total only 34.9 hours."

"These figures have three interesting things to tell us about the future," McChesney said. "First we are going to continue meeting the demands of a popula-

tion that is growing at the rate of 2.5 million people per year. Second, we will have to do this job with an available work force that is growing hardly at all. Third, we will finally accomplish the task through the continuing rapid growth of electrification in industry."

SPENCER A. MOORE, general sales manager of Public Service Electric & Gas Company, told the forum that the availability of dependable sources of power is necessary for the nation's productivity plans for the future. "In the last ten years electrical load growth has been at such a fast rate that there never has been a single day when we have not been actually building a new generating station or installing a new turbine in an existing station," Moore said. "Today we are engaged in construction of two new stations, one at Linden which will provide 450,000 kilowatts and another in North Bergen county with a 580,000-kilowatt capacity. Still another station, the location of which has not yet been determined, will provide an additional 300,000 kilowatts," he added.

The forum was attended by some 400 area business managers interested in keeping abreast of the latest production developments and techniques. The Public Service Electric & Gas Company cosponsored in 1951 the first productivity forum, which was also held in Newark.

The March of Events



Merger Proposal Filed With SEC

FIVE Massachusetts electric utilities filed a merger proposal with the Securities and Exchange Commission recently. Under terms of the proposal, Essex County Electric Company, Salem, would take over Amesbury Electric Light Company, Haverhill Electric Company, Lawrence Electric Company, and Lowell Electric Light Corporation. The resulting company would be known in the future

as Merrimack-Essex Electric Company.

All five companies are members of the New England Electric System, a holding company. The joint application by the concerns said the proposed merger would result in greater efficiency, economy of operation, and simplify New England Electric's corporate organization.

The SEC scheduled a hearing on the plan for February 20th. The utilities also filed an outline of their merger proposal with the Federal Power Commission.

Alabama

Proxy Attack Fails

MANAGEMENT of the Alabama Gas Corporation emerged victorious in the contested proxy contest for control of the company with the election of five of the nine company directors. Final count of proxy votes at the recessed annual stockholders' meeting last month gave the management slate 467,526 votes or 56.6 per cent of the total number of shares

voted and the opposition slate 358,133 votes, or 43.4 per cent.

Outcome of the vote was announced at the meeting by Attorney James A. Simpson, who had been named "judge" to pass on the validity of the ballots.

Result of the vote insured the re-election of Joseph N. Greene as chairman and R. A. Puryear, Jr., as president, and the continuation of the company's present policies of operation as a private utility.

Iowa

New Utility Agency Proposed

CREATION of a new state public service commission to regulate all utilities,

both publicly and privately owned, was proposed in the state legislature last month by Senator Robert R. Rigler, Republican

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of New Hampton, and other members.

The measure would abolish the state commerce commission, but not until terms of present elected members expire. The proposed new commission would be empowered to regulate utilities, including their rates and security issues. It would

be supported by fees from the utilities. The fee would be three-fifths of one per cent of gross revenue.

The bill provides that the governor would appoint the first five commissioners, to staggered terms. Nominations would be subject to state senate confirmation.

Nebraska

Public Power Bills Killed

THREE public power bills were killed recently by the state legislature's public works committee after power district spokesmen testified they would be harmful to the state's electric system.

The bills killed by the committee were: LB 10, which would have allowed towns to vote any time to take over power systems from districts at a later date; LB 14, requiring public power districts to report

net profits from operations in each town they serve; LB 20, authorizing towns to set electric rates that power districts may charge.

Attorney for the Omaha Public Power District testified that all three bills would make it more difficult for the districts to borrow money to build new facilities.

The president of the Custer Rural Public Power District said the measure "would disrupt, maybe even sabotage, our operations."

New Mexico

Utility Commission Proposed

A PROPOSED state constitutional amendment and accompanying statute to provide a new public utility regulatory body for New Mexico were introduced in the state legislature recently. The proposed legislation would set up a five-member elected state corporation commission, with

the members being paid \$12,000 a year, it was reported.

The amendment, similar to one defeated by the electorate in 1955, would merely set up the commission, while the state legislature would prescribe powers and duties of the agency and have the power to enact laws to regulate utilities.

Washington

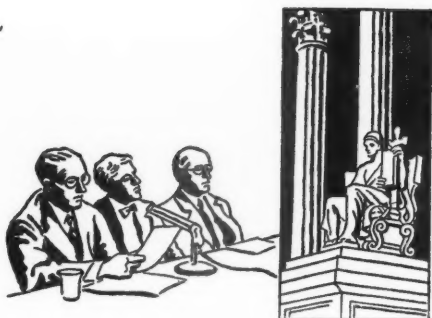
State Legislation

GAS companies would be given the power of eminent domain to condemn private property for right of way under terms of a bill introduced in the state legislature last month.

Abolition of the state power commission was also proposed by a bill introduced in the legislature last month by Representatives Rasmussen and Munsey, both of

Tacoma, and Goldmark of Okanogan. The bill would retain provisions for operating agencies to enable cities and public utility districts to engage in joint acquisition, construction, and operation of electric power systems.

Governor Rosellini had suggested the state legislature explore the need for retaining the commission. He said its functions could be transferred to another agency.



Progress of Regulation

Trends and Topics

Trended Original Cost as Substitute for Reproduction Cost

PROOF of present fair value has been presented in several forms. Market value, the price at which a willing seller would sell and a willing purchaser would buy, has been given little weight because there is no market available for determining comparative prices. Parcels of land are bought and sold in a community and market price may be ascertained, but a large public utility plant is obviously in a very different category. Reproduction cost evidence is accepted by commissions which do not adhere to the original cost theory. Original cost stated in terms of purchasing power of the dollar is another alternative.

Acceptance of Trended Original Cost

The Pennsylvania commission in its recent decision on rates of the Bell Telephone Company of Pennsylvania (16 PUR3d 207) said it was required to give consideration, among other things, "to original cost and to reproduction cost (or trended original cost)." The company in supporting its claims used Western Electric Company construction cost index numbers to trend original cost. The commission said that while the applicable statute speaks of "reproduction cost," the commission has accepted trended original cost as a reasonable substitute. The commission referred to the superior court decision in the Equitable Gas Company case (68 PUR NS 65), where it was said that "original cost trended would, if depreciated, approximate a value equal to reproduction cost depreciated."

Evidence of trended original cost was considered by the Illinois commission in determining reproduction cost. Original costs by accounts and year of installation had been trended by the application of the Handy-Whitman Index. The commission explained the development and use of this index (6 PUR3d 108). The commission said that while the evidence might be open to challenge in some minor respects, such evidence did reflect a decrease

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in the purchasing power of the dollar and the change in economic conditions and was pertinent. The commission in an earlier case, in 1937, had given little weight to indexes viewed as unreliably applied (19 PUR NS 177).

The Ohio commission, in a telephone rate case (82 PUR NS 341), rejected a contention that the trending method of pricing applied to certain property was not proper in establishing reproduction cost. The statute provided that the commission should find the "cost of new production" of the physical property, except land. The commission ruled that the application of cost indexes to recorded book costs satisfied the statutory requirement and was, therefore, competent evidence of "cost of new production" or "reproduction cost new." Trended original cost has also been used in California (PUR1931A 132).

Under an Indiana statute providing that costs of reproduction may be taken into account, the Indiana supreme court ruled that the statute was broad enough to permit the commission and the reviewing court to utilize costs at the time of construction or purchase, costs of bringing the property to its present state of efficiency, and also reproduction costs at current prices (74 PUR NS 265).

Criticism of Trended Cost

The underlying objections to evidence of reproduction cost of existing plant constructed piecemeal, as distinguished from reproduction cost of a modern plant at one time, may be noted in criticisms of trended original cost. An exhibit presented to the Missouri commission was based upon an estimate of the amount of plant cost which would have been incurred if the current price for materials and labor had prevailed at the time the plant was actually constructed. This method, said the commission, was not to be confused with a cost of reproduction estimate which envisions wholesale reproduction at current price levels. The plant had been built on a piecemeal basis. Present book costs reflected cost of piecemeal construction. The current cost estimate reflected a factoring up of experienced piecemeal costs to current cost levels. The commission did not believe that this provided a satisfactory measure of what it would cost to construct the plant at the time of the rate proceeding (77 PUR NS 33).

The New Jersey supreme court, upholding a commission rate order, although it had been contended that the commission ignored substantial evidence in relation to reproduction cost, declared at the outset that the commission is not bound by any single formula or combination of formulae (100 PUR NS 379, 390). The court also discussed proof as to reproduction cost of mass items such as poles, cables, and stations. Buildings and central office equipment had been valued by company witnesses "with the aid of special index numbers" based on the results of computations by experts. The court said that there was a danger of injustice to the public in basing a fair value determination on reproduction cost new of obsolete or obsolescent facilities by adjusting actual costs to the current purchasing power of the dollar.

Estimated cost new, as used in a gas rate case before the Kentucky commission, was described as "another variation of cost of reproduction or repro-

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duction cost new." The commission said it appeared to have been determined by applying certain trends to the items of plant. The commission, in view of its past decisions on reproduction cost estimates, which it called highly speculative, refused to accept the estimated cost new as a sole method to be used in arriving at a rate base, but in accordance with Kentucky statutes it considered this evidence (95 PUR NS 65).

Evidence of Price Changes

Trended original cost must, of course, be based upon proper percentages. The Handy-Whitman Index, mentioned in the Illinois case, *supra*, has often been used by utility companies. Less precise evidence of price changes has sometimes been presented. In a case before the Indiana commission (51 PUR NS 93) a witness took the actual cost and added 25 per cent to bring the figures down to the time of the rate proceeding. The commission said it did not believe much weight could be given to this testimony as to the value of the property "on a reproduction cost new basis." The percentage allowance was called arbitrary.

The Delaware supreme court termed inadequate a rate base which was 12 per cent in excess of depreciated original cost, since it did not "properly reflect the impact of inflationary prices" (8 PUR3d 286). The New Mexico commission, in fixing rates for a liquefied petroleum gas company, determined original cost less depreciation and then added 5 per cent for reproduction cost (72 PUR NS 75).

Before the Supreme Court discarded fair value and allowed original cost to be used in fixing a rate base, it examined evidence of price changes in the West case (8 PUR NS 433). Price indexes were not applied to cost but to an earlier valuation. The court did not think it appropriate to obtain present value by trending the earlier valuation and net additions by applying price indexes which were not prepared as an aid to appraisal of the property. A wide variation in employing different indexes, said the court, impugned their accuracy. The use of the relation of values of specific articles as of two given dates, the court added, is quite distinct from the application of general commodity indexes to a conglomerate of assets constituting a utility plant.

Review of Current Cases

Reproduction Cost Figures Rejected and Hypothetical Debt Ratio Used in Rate Case

THE Mississippi commission denied Southern Bell Telephone & Telegraph Company's application for a rate increase. It found that, after excluding working capital and plant under construc-

tion from a net investment rate base, existing rates were sufficient to enable the company to operate successfully, to maintain its financial integrity, and to attract capital at reasonable cost. The return

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under existing rates was calculated to range from 4.96 per cent to 5.08 per cent after adjusting debt ratio and cost of capital.

Statutory Requirements

The statute governing the commission in its regulation of public utility rates was enacted on March 29, 1956. It provides that rates shall be just and reasonable and such as to yield a fair return on the reasonable value of the company's property. It also provides for the determination of a rate base after giving due consideration to all elements that are generally considered in determining a rate base.

The law prescribes no formula or technique to be followed and is silent as to the proper measurement of a fair rate of return or the dimensions of the reasonable value of the company's property. Nor does it specify the elements that are generally considered in determining a rate base. The dominant standard, said the commission, is that rates shall be just and reasonable.

Reproduction Cost Evidence

The company claimed that the term "reasonable value" as used in the statute is synonymous with what is commonly referred to as "fair value" in other jurisdictions. The commission agreed. But the company relied almost entirely on its estimate of reproduction cost new of the property less existing depreciation in arriving at its alleged reasonable value. After discussing the evidence adduced by the company's witnesses, the commission found it to be "conjectural, speculative, unrealistic, and unreliable." Consequently, it gave no weight to such evidence.

Plant under Construction and Working Capital

The inclusion of plant under construc-

tion in the rate base was held to be contrary to sound rate-making principles. The commission pointed out that when construction work is completed, total cost, including interest, taxes, and other overheads, is capitalized. It believed, therefore, that the company would suffer no injustice by exclusion of such construction from the rate base.

Much recent construction was designed for new customers and for upgrading of present subscribers. If, therefore, plant under construction were included in the rate base, equity would require the inclusion also of estimated additional revenue produced. The company offered no evidence as to such revenue.

Likewise, no allowance was made for working capital. The company accrues a substantial sum of tax money in advance of the tax due dates, and, therefore, enjoys the use and benefit of such funds in its business. The subscribers contribute this money through their monthly bills. If they were obliged to pay a return on this working capital, according to the commission, it would be tantamount to a return on their own funds. Furthermore, it would constitute unjust enrichment to the company.

A net average investment rate base was treated by the commission as the reasonable value of the company's property, since, in its opinion, that was the only competent and reliable evidence in the record.

Rate-fixing Standard

In fixing rates, the commission said, it is essential to achieve an equitable balance between the investor and consumer interests. The method used is of less importance than the end result reached. The commission observed that with an established rate base, the rate of return is a function of the net operating income.

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Thus, if such income is fair and reasonable, the rate of return is reasonable, whatever the percentage.

Capital Structure

The commission was of the opinion that the company's capital structure was imprudent and uneconomical because of an abnormally low amount of debt. Its debt ratio during the test period averaged 21.07 per cent. On the other hand, the debt ratios of electric and gas companies have advanced to over 50 per cent. Moreover, unlike electric and gas companies, the telephone company's capitalization had no preferred stock. While the electric and gas companies have been reducing their over-all cost of capital, thus benefiting the ratepayers, Southern Bell has been increasing its cost of capital.

It has assets in excess of one billion dollars, according to the commission. It paid dividends every year during the economic depression in the 1930's. Also, its earnings record has been excellent. The commission held that from the standpoint of risk and stability of earnings, Southern Bell could carry as much long-term debt as is characteristic of the electric utility industry.

Accordingly, it adopted an assumed debt ratio ranging from 45 per cent to 50 per cent for the purpose of

determining the fairness of the company's rates.

Cost of Capital

The commission considered the cost of the company's debt and equity capital. In determining the cost of equity capital, it considered both dividends and surplus. Earnings-price ratio, it said, constitutes a sound basis for determining the investor's requirements.

In considering cost of financing, the commission noted that Southern Bell incurs only a nominal expense in selling all of its common stock to American Telephone and Telegraph Company. Also, since the latter purchases every share of common stock at par value, it would be unrealistic to consider market pressure in determining the cost of equity capital to Southern Bell.

The commission concluded that fair and equitable earnings-price ratios would be 6.30 per cent at a debt ratio of 45 per cent and 6.40 per cent at a 50 per cent debt ratio. In so doing, it considered economic conditions, the company's growth record and prospects, its financial history, technological developments, and the company's protection against destructive competition. *Mississippi Pub. Service Commission v. Southern Bell Teleph. & Teleg. Co. Docket No. U-17, December 20, 1956.*



Higher Cost under Fuel Adjustment Clause Passed On to Electric Consumers

INCREASED cost of electricity purchased under a fuel adjustment agreement impelled the Florida Public Utilities Company to seek authority to pass on the added burden to its consumers in the area of Marianna, Florida. The Florida commission authorized the adjustment clause to be applied to the company's existing rates on a percentage basis.

During the past year the fuel adjustment cost was sufficient to reduce the utility's return on investment by 1.65 per cent. Despite the rising commodity cost, along with a general increase in operating costs, the company's customers had not been called upon to pay a rate increase since 1946.

Although the present fuel adjustment

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agreement had been approved by the Federal Power Commission, it had never been submitted to the state commission. As the agreement would soon have to be renegotiated, the Florida commission

indicated that the new contract should be submitted for its consideration before putting it into effect. *Re Florida Pub. Utilities Co. Docket No. 4884-EU, Order No. 2428, December 19, 1956.*



Texas-to-Florida Gas Pipeline Authorized Subject to Conditions

THE Federal Power Commission, under § 7 (e) of the Natural Gas Act, authorized two companies individually to construct and operate connecting natural gas pipelines extending from southern Texas to a point below Miami, Florida. A number of conditions, however, demanded by public convenience and necessity, were imposed along with the certificate grants. The commission noted the need for natural gas in Florida, considering the competitive and other disadvantages under which the state rests in depending upon petroleum products alone for fuel.

Coastal Transmission Corporation proposed a 574-mile pipeline from southern Texas to Baton Rouge, with four compressor stations and 400 miles of supply laterals. From Baton Rouge, Houston Texas Gas & Oil Corporation proposed to continue the line through to southern Florida, a distance of 942 miles, with four compressor stations and 700 miles of laterals in Florida. Coastal's facilities were estimated to cost \$54,589,000, while those of Houston Gas would cost about \$94,258,000.

The "Transportation" Service

Coastal would initially constitute the sole source of supply to Houston Gas and the latter would furnish Coastal's sole market. Showing long-term contracts for an ample supply of gas, Coastal proposed to deliver to Houston Gas on a cost-of-service basis an initial volume of about

250,000 Mcf of gas per day, of which about 100,000 Mcf per day would be sold by Houston Gas for resale. But approximately 150,000 Mcf per day would consist of "transportation" gas delivered to two large Florida power companies for use as boiler fuel. This gas would be purchased by the power companies directly from producers in Texas and Louisiana, and Coastal and Houston Gas would merely transport it. Houston Gas would receive the entire payment for the transportation, compensating Coastal in turn, under a cost-of-service agreement, for its part in the service.

Although the arrangement for transportation of large volumes of gas for use as boiler fuel would not in itself render the project unacceptable, the commission indicated, several defects in the arrangement were apparent. The transportation charge was to be determined basically on a comparison with the cost of oil, and would initially be substantially below the cost of rendering the transportation service. Contractual provisions insured, moreover, that charges to the power companies would remain competitive with those for oil, without proper regard for cost-of-service considerations. Other provisions permitted the power companies to cancel or reduce their obligations on a number of contingencies. Invocation of these provisions could leave both transmission companies with up to 60 per cent unused capacity.

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In authorizing the project, therefore, the commission required new transportation rates to be filed based on cost of service. The cancellation and reduction-of-take provisions were ordered to be eliminated.

Commissioner Connole, dissenting, pointed out that the transportation charge, if it were to bear its fair share of the cost of service, would make the total cost of gas to the power companies prohibitive. Undoubtedly, therefore, they would not take gas under the conditions imposed by the commission. This commissioner thought the project was economically unfeasible and should be denied outright.

Rate-of-return Equalization

The commission approved the economic feasibility of the project, though the rates of return for the first three years appeared to be somewhat less than fair—well under 6 per cent. An appreciable part of the return for Houston Gas would be derived from a rate-of-return equalization agreement between the two companies.

It was agreed that if, during the first three years of operation, Houston Gas' rate of return should be less than 6 per cent, Coastal would reduce its bill, rendered on the basis of cost of service at a $6\frac{1}{4}$ per cent rate of return, by an amount sufficient to equalize the rate of return of the two companies. The commission said this arrangement, as it stood, failed to meet the requirement that a rate be definite and certain and constituted an unlawful automatic price adjustment scheme.

Furthermore, the $6\frac{1}{4}$ per cent rate of return for Coastal was said to be exces-

sive, considering that, in view of the commission's disapproval of cancellation provisions, the company would have assured markets under long-term contracts. With 15 per cent common equity financing, a $6\frac{1}{4}$ per cent rate of return would produce a 14 per cent return on common stock, which would be excessive. The commission directed that the cost-of-service charges be based upon the over-all rate of return of the two companies, though never exceeding 6 per cent.

Financing

Both companies proposed to provide only 12.4 per cent of the cost of the transmission facilities from sales of common stock. Approximately 15 per cent would be provided from interim convertible notes. First mortgage bonds would account for about 73 per cent.

The commission required that the common equity ratio be raised to 15 per cent. A smaller percentage would result in an unduly large portion of income going for debt service and leaving a very small margin for times when economic conditions might be less favorable. The companies were directed to submit complete financing plans before undertaking to put them into effect.

Houston Gas further proposed to acquire some distribution facilities. Since the amount of funds needed for this project was rather indefinite, the commission also required a complete plan for financing this undertaking. *Re Houston Texas Gas & Oil Corp. et al. Docket Nos. G-9262 et al. Opinion No. 301, December 28, 1956.*



Guaranty of Bonds Constitutes a Security

THE Securities and Exchange Commission authorized Public Service Company of Oklahoma, an electric utility subsidiary of Central & South West

Corporation, a holding company, to enter into an amended contract with Transok Pipe Line Company, a nonaffiliated intrastate natural gas pipeline company, for a

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natural gas supply to be used as boiler fuel at the electric company's generating stations.

Contract Provisions

The price for gas to be paid by Public Service would be sufficient to pay Transok's operating expenses and interest on, and amortization of, the principal of its outstanding first mortgage bonds. If the pipeline company should default on its interest or principal payments the electric company would, at the election of the trustee under the mortgage indenture, take over the operation of the pipeline system and pay rental sufficient to cover principal and interest on the first mortgage bonds.

The contract further provided that upon default the electric company might purchase the pipeline system for an amount equal to all amounts then or thereafter payable for principal and interest, such payments being made to the trustee

when and as they might be payable by the terms of the bonds.

Guaranty of Bonds

These obligations of the electric company were stated in the contract to be assignable by the pipeline company to its indenture trustee as security with respect to the payment of indebtedness on its outstanding bonds and, in fact, were assigned accordingly. The commission held that these arrangements constituted a guaranty of, or assumption of, liability on the bonds and, therefore, constituted a security subject to the provisions of §§ 6(a) and 7 of the Holding Company Act. The commission concluded, however, that the guaranty satisfied the standards of § 7 in that it would have only a slight effect upon the consolidated capitalization ratios and earnings coverages of the holding company system. *Re Public Service Co. of Oklahoma, File No. 70-3501, Release No. 13328, December 5, 1956.*



Co-operative's Right to Complain Sustained but Territorial Violation Charge Dismissed

A CO-OPERATIVE, though not under the commission's jurisdiction, has standing to complain against the conduct of a regulated utility, said the Missouri commission, in ruling on a complaint by an electric co-operative that an electric company had extended its lines beyond its authorized territory to serve a new residential development which the co-operative itself sought to serve. A co-operative has the same right to complain as anyone else, if it believes a utility has violated its authority. The consumer in this instance preferred service by the regulated company. In a prior order the company was authorized to construct a transmission line, which would permit it to serve industrial and residential customers over a wide

area. From this transmission line, the company constructed a 2½-mile line to the residential development without obtaining further specific authority.

Although the commission did not expressly rule that the company's action was entirely proper, it did, in effect, approve the extension by dismissing the co-operative's complaint. The company has a right, it was said, to make connections from the transmission line for reasonable distances and reasonable purposes without obtaining additional authority.

The commission indicated that it would be inclined to grant the extension authority without further hearing if the company had in fact exceeded its authority in building the line. And if the owners

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of the residential development had demanded service of the company, the commission would have required it to be fur-

nished. *Cuivre River Electric Co-operative, Inc. v. Missouri Edison Co. Case No. 13,482, December 18, 1956.*



Lack of Intrastate Allocations Results in Denial Of Rate Increase

THE California commission denied the applications of certain railroads and connecting highway common carriers for permission to increase local and joint freight rates. While over-all rates of return and operating ratios were helpful in appraising the adequacy of interstate carrier operating revenues, as a system, and the trend in recent years of such revenues, they were of no assistance to a determination of issues relating exclusively to intrastate rates, pointed out the commission. As applied to the prescription of intrastate rates by state authority, it was jurisdictional that intrastate revenues, expenses, and properties be ascertained.

The applicants had contended that reliable separations of intrastate operating expenses and investment could not be obtained.

The commission commented that the testimony had conveyed the impression of a manifest desire to search out reasons why the separations could not be made, instead of a willingness to adopt an open-minded attitude in the solution

of the problem. Naturally, said the commission, allocations would in many instances be necessary. While they might be somewhat inaccurate in the initial formulations, with the accumulation of experience, they would reflect reliability. The evidence was convincing that the development of such separations procedures was feasible.

With respect to the cost of developing data, modern electronic computing machines were now available which would expedite and greatly facilitate the accumulation and processing of large masses of accounting, operating, and other statistical information. The commission concluded that the applicants had failed to sustain the burden of proving the proposed rate increases justified. Present intrastate rates had not been shown to be unreasonable or otherwise unlawful, nor had returns upon intrastate operations been shown unreasonable. *Re Freight Rates and Charges, Decision No. 54215, Application No. 37697, December 11, 1956.*



Higher Freight Rates Rejected as Argument for Continuing Needless Passenger Service

SEVERAL chambers of commerce, along with others, in an action to set aside an Arizona commission order authorizing a railroad to discontinue a branch-line passenger service, failed to sustain their burden of proving "by clear and satisfactory evidence" that the order was un-

reasonable or unlawful, the Arizona supreme court ruled on appeal from a lower court.

The primary consideration, said the court, was whether public convenience and necessity required a continuation of the service. If a cessation of operation

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would result in some public inconvenience, then the question of financial loss to the company would become important. It would have to be weighed against the loss to the public resulting from inconvenience. The lower court found that the company sustained out-of-pocket losses amounting to much more than the passenger revenues. It also found that the public need for the service was not sufficient to warrant continued operation, considering that adequate bus service was available.

The protesting parties argued that the

passenger service should not be discontinued, because the company had secured freight rate increases to compensate for losses on passenger operation. The court rejected this argument. Such a situation would not require an indefinite continuation of passenger service. If the freight rates should be found excessive after passenger operations are discontinued, the court observed, the proper course of action would be to reduce the freight rates, not continue a needless service. *Safford Chamber of Commerce et al. v. Arizona Corp. Commission*, 303 P2d 713.



Accessorial Services Charge Contained in Single Rate Tariff Not Discriminatory

THE United States Supreme Court affirmed a lower court's judgment holding that single factor export rates charged the federal government by railroads were not discriminatory even though both line-haul and accessorial services were included in the tariff schedule, and the government performed its own accessorial services.

Before the Korean War, military export shipments passing through Army base piers in Norfolk, Virginia, were carried by the railroads at a single rate which covered both transportation and pier services. Pier services included wharfage and handling.

The railroads, in accordance with tariffs filed with the Interstate Commerce Commission, furnished these accessorial services through a specified public wharfinger at public sections of the piers. After the outbreak of war, the government decided to operate certain portions of the piers directly, in order to facilitate shipments. The railroads continued to charge the same line-haul rate as before on government shipments and refused to grant an

allowance for performance of the accessorial services by the government.

Interstate Commerce Act Not Violated

The railroads' refusal to grant the government an allowance, held the court, did not violate any section of the Interstate Commerce Act since the government could have used the same facilities as commercial shippers and obtained the benefits of the tariff but chose not to comply with the provision requiring the shipper to use a specified public wharfinger under contract to the railroad for performance of the pier services. The government had been treated identically with those private shippers who did not care to comply with the tariff requirements for business reasons. The fact that the government's operation of its private pier was caused by a national emergency did not alter the situation.

Obligation to Perform Discharged

The federal government, pointed out the court, had the right to prohibit a carrier from performing switching upon pri-

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vate tracks even though the carrier might be willing and able to perform the service. Once that was done, the carrier's obligation to perform the service was discharged. The payment of allowances to the shipper for performance of the service, in whole or in part, would be unlawful, except as a voluntary concession of the carriers to the government under § 22 of the Interstate Commerce Act.

Although the government had the right to have shipments accorded the same privileges given others, and could even obtain preference or priority in case of an emergency, or be granted and accept a voluntary preference under § 22, it could not otherwise require extra services or allowances. *United States v. Interstate Commerce Commission et al.* 1 L ed 2d 211, 77 S Ct 241.



Electric Company Ordered to Rehabilitate Distribution System and Reduce Return

A SERVICE complaint brought by a town against a small electric company resulted in the Wyoming commission ordering the company to rehabilitate distribution facilities. The company was also ordered to compile and maintain proper records, to file new tariffs in accordance with the commission's reduction in the return allowance, and to submit quarterly reports of operating activities.

Service Deficiencies

The commission found that, in most instances, secondary lines attached to transformers were too small in size and inadequate to serve existing load. Line loss was far above normal. Transformers were overloaded and improperly located. Voltage leaks occurred throughout the system because of uncovered secondary wires brushing against trees, particularly during times of high winds and inclement weather.

Meters were not grounded, and most of the supply loops or drop lines were uninsulated and improperly attached, creating safety hazards. Conductors were improperly fastened to insulators and some of the poles were broken at the base.

The commission found that since the hearing, the company had proceeded to

rehabilitate the distribution system under the supervision of an engineer and according to recognized standards and the provisions of the National Electrical Safety Code. Progress had reached the point where facilities, as rehabilitated, would enable the company to furnish adequate service. Efforts in that direction were directed to continue.

Rate Base and Return Allowance

The company had been furnishing service to certain consumers at rates not filed with or approved by the commission. Consumer accounts had been allowed to become delinquent. Plant accounts contained certain items of obsolete equipment not used by the company, which had been fully depreciated. The company had been furnishing service to an interrelated corporation without charge and had paid capital expenditures incurred by the non-utility business.

The president of the company testified that, in the future, the company would charge all consumers the proper filed tariff rates and that an adequate accounting system would be installed and maintained to properly reflect assets and liabilities, operating expenses, and revenues, and to provide a sound basis for the

PUBLIC UTILITIES FORTNIGHTLY

determination of a proper rate structure.

The commission approved a rate base study as modified. An allowance for materials and supplies and working capital was included.

Under existing rates, the company was earning a return of 10.36 per cent on the net investment rate base. Such return was

considered excessive, and the company was required to file a revised schedule designed to reduce annual gross revenues. A return of approximately 7 per cent was considered more reasonable. *Town of Hudson, Wyoming v. Svilar Light & Power, Inc. Docket No. 9306, January 2, 1957.*



Failure to Exhaust Administrative Remedies Is Bar to Equity Action

THE New Mexico supreme court affirmed a lower court's decision which had dismissed a complaint on the ground that the plaintiff had failed to exhaust statutory administrative remedies. The plaintiff's action had been brought to recover amounts paid a gas company for service under a commission rate order which had increased existing contract rates between the company and the plaintiff.

By not first awaiting the final outcome of a pending statutory review proceeding, held the court, the plaintiff had failed to exhaust administrative remedies and consequently could not maintain the present action. The trial court in the pending review proceeding would be called upon to render important decisions on how far the commission could go in changing a so-called contract rate, after the public interest had entered the equation. The court, in the instant case, would not do so. The

precise question before it was whether the plaintiff should have exhausted statutory remedies before invoking the aid of equity. The answer was in the affirmative.

Dissent as to Contract Rate

In a strong dissenting opinion, Justice McGhee stated that when the commission had made and enforced an ex parte order, it acted in excess of authority and jurisdiction. A contract rate, he said, should not be changed by the utility under a mere rate filing procedure, or by the commission in an ex parte order. A contract rate could be changed only after a hearing and a finding that the change was required in the public interest. Neither the filing of a new rate nor an order of the commission without notice, hearing, and the requisite findings as to public interest could effect the change. *Potash Co. of America v. New Mexico Pub. Service Commission, 303 P2d 908.*



Capital Transit Original Cost Rate Base Upheld

THE 1954 order of the District of Columbia commission granting Capital Transit (now D. C. Transit System, Inc.) a rate increase has been attacked again. The original order was remanded to the commission, upon appeal, for a fuller statement of its reasons for adopting an

original cost rate base. The instant proceeding was brought in a federal district court by a transit rider who asserted that the commission's reasons, as set forth in supplementary findings, did not justify the use of an original cost rate base. The court sustained the commission's determi-

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nation. The commission expressly found that the original cost rate base, which it had historically used, is a realistic method based upon an equitable balancing of public and investor interests. It indicated that economic conditions had not changed so as to warrant the use of any other rate base, and that the fares resulting from

original cost were reasonable. The commission considered the use of an original cost rate base reasonable and equitable after comparing the results it would produce with the results of an operating ratio method. *Spiegel v. District of Columbia Pub. Utilities Commission*, 145 F Supp 679.



Flat Water Rates Increased 40 Per Cent After Disallowance of Expenses

WHILE the Connecticut commission denied a small water utility a flat rate increase from \$25 to \$45 per customer per annum, it did authorize a new flat rate charge of \$35 after disallowing a number of expenses. The utility was operated by a real estate development company which originally undertook the water service to facilitate the sale of its residential properties in Waterford, Connecticut, outside New London.

Rulings on Expense Claims

The company sought to allocate a part of its officers' salaries to the utility as operating expenses. But the commission refused to allow any specific amount for this item on the ground that insufficient evidence had been presented to enable it to evaluate services rendered by the officers.

Since only a small portion of office space, and related expense, was used for utility operations, a proportionately small allowance was made for office expenses. An annual charge of \$1.75 a customer was allowed for bookkeeping and auditing, as against a claim of about \$5 a customer urged by the company.

A claim for legal expenses was disallowed as a nonrecurring expense. Also disallowed was a claim for interest charges. The cost of borrowed capital,

the commission said, should be accounted for as a deduction from income and not as a charge against operating expense.

Although no specific price had been applied to an old system of water mains at the time it was acquired along with a tract of land purchased for development purposes, the commission adopted an estimated depreciated cost proposed by the company. Customers opposing the rate increase maintained that the amount was excessive because it could not be shown that it was in fact paid for the mains. The commission observed that even though the mains were probably thirty-five years old, they were still actually in use and the company had assumed responsibility for eventually replacing them. Depreciation expense was computed for the mains on the basis of a 20-year life.

Comparability of Municipal Rates

The customers argued, finally, that the proposed rates would be higher than those applied to patrons of the New London municipal plant residing outside the city, even though they paid a 20 per cent surcharge. The commission noted that the development company purchased water from New London at regular domestic rates established for customers served beyond the city limits. Therefore, it pointed out, the situation of New London patrons

PUBLIC UTILITIES FORTNIGHTLY

and patrons of the development company was not comparable. *Re Ridgewood*

Park, Inc. Docket No. 9366, January 10, 1957.



Equity Financing Preferred to Debenture Issue In View of 47 Per Cent Debt Ratio

ALTHOUGH the market value of Carolina Telephone & Telegraph Company's common stock approximated \$150 a share, the North Carolina commission approved a request by the company to issue 58,310 additional shares of common at not less than \$100 par value, preserving pre-emptive rights, of course. New capital was needed to pay off short-term bank debt incurred in connection with a large construction program. The company had raised over \$33 million since 1947, most of which was equity funds. During 1956 more than 66,000 shares were sold at \$125 a share.

The commission was of the opinion that the new funds should be raised by the sale of stock rather than debentures for several reasons. It considered the debt ratio of 47.4 per cent as too high. Equity

financing would reduce this figure and help assure the success of further financing contemplated by the company in the near future. The commission observed that, in view of the current high interest rates, debentures probably could not be sold at less than 4½ per cent. Moreover, they would be a detriment to future financing. The company anticipated no difficulty in selling the proposed stock issue at par but had no assurance that it would not experience difficulty at a price above par. Noting the company's duty to manage its financing so as to assure successful future financing, and in view of the existing market conditions, the commission concluded that the issue should be authorized at not less than par. *Re Carolina Teleph. & Teleg. Co. Docket No. P-7, Sub 74, January 4, 1957.*



Authority to Invade Municipal Water District Denied

A PRIVATELY owned water utility was denied authority in California to provide service to two areas situated within the boundaries of municipal water districts. The two areas were the sites of new residential subdivisions proposed to be built.

As to one of the areas, in which the municipal utility had no facilities, there was no protest against private service, but the applicant was nevertheless unable to prove public convenience and necessity to the commission's satisfaction. No testimony, either from the developer or from any of the public, was offered to show

public need. Nor was any contract with the developer for the installation of a water system shown. Moreover, the proposed water supply was found to be inadequate.

The municipal water district contested the proposed service to the other area. As to it the district was ready, willing, and able to furnish service. While the developer was apparently able to obtain an advantageous agreement for service from the private utility, the commission would not countenance a duplication of costs to consumers.

Finding that public convenience and

PROGRESS OF REGULATION

necessity were again unproved, the commission observed that it would be difficult, if not impossible, for a water company to establish public convenience and necessity to serve within the boundaries of a municipal water district when the evidence shows that the district is lawfully established with boundaries lawfully fixed, and that it is providing or is ready, willing,

and able to provide the necessary service.

The individual operators of the utility, doing business as La Mirada Water Co., also sought authority to change the business name to Public Water Co. The commission disclaimed jurisdiction to grant such authority. *Re Robinson (La Mirada Water Co.) Decision No. 53339, Application No. 37007, July 10, 1956.*

Other Recent Rulings

Review of ICC Order. The United States district court refused to upset an Interstate Commerce Commission order denying a petition for reopening and reconsideration of a contract motor carrier's grandfather permit where the record did not disclose the commission's denial to be arbitrary or capricious. *Neuendorf Transp. Co. v. United States, 145 F Supp 672.*

Exportation of Electric Energy. The Federal Power Commission granted an electric company's application for authority to transmit energy from the United States to Canada, imposing limitations as to the maximum amount and rate of transmission, upon a showing that the sufficiency of electric supply within the United States would not be impaired and that the co-ordination of facilities subject to the commission's jurisdiction would not be impeded. *Re Detroit Edison Co. Docket No. E-6515, December 17, 1956.*

Telephone Exchange Extension. A petition by residents of one telephone exchange for an order directing an extension of service on a direct basis from another exchange was dismissed by the Wisconsin commission where the effect

would have been to decrease the number of customers at the present exchange by as much as 21 per cent, thus materially affecting the cost of service to the remaining customers. *Steeber et al. v. General Teleph. Co. of Wisconsin, 2-U-4695, December 21, 1956.*

Express Service Discontinued. The Wisconsin commission authorized the discontinuance of a railway express prepay station located in a small community, upon a showing that public use of the facility had declined to very meager proportions and that motor carrier service was available in the area; but the commission made it clear that the alleged inability of the company to secure a responsible employee for the station did not of itself constitute a valid reason for discontinuance. *Re Railway Express Agency, Inc. 2-R-3139, December 21, 1956.*

Value for City Acquisition. In determining the value of electric properties for the purpose of municipal acquisition, the Alabama commission refused, under an Alabama statute, to consider good will or future earning capacity of the company and rejected claims of damages (other than statutorily limited severance dam-

PUBLIC UTILITIES FORTNIGHTLY

age) likely to be sustained by the company as a result of having to sell that part of its properties located in the city. *Re Utilities Board of the City of Ozark, Docket 14251, December 27, 1956.*

Dedication of Service. Denying a rehearing of a decision involving dedication of service by a water company, the California commission asserted its jurisdiction, if the issue be raised, to determine when and under what conditions a dedication of service has been made, the question being a mixed one of law and fact. *Sawyer v. California Water & Teleph. Co. Decision No. 54340, Case Nos. 5596, 5606, December 28, 1956.*

Railroad Bridge Handrails. The Connecticut commission, upon petition by railroad employees' unions, ordered footwalks and handrails to be installed on railroad bridges found to be potential hazards to crew members by reason of the number of switching operations on or near the bridges and because of the frequent occasion for crew members to be on them; but the commission refused to find that all railroad bridges within the state necessarily required footwalks and handrails. *Re Brotherhood of Locomotive Engineers et al. Docket No. 9153, January 10, 1957.*

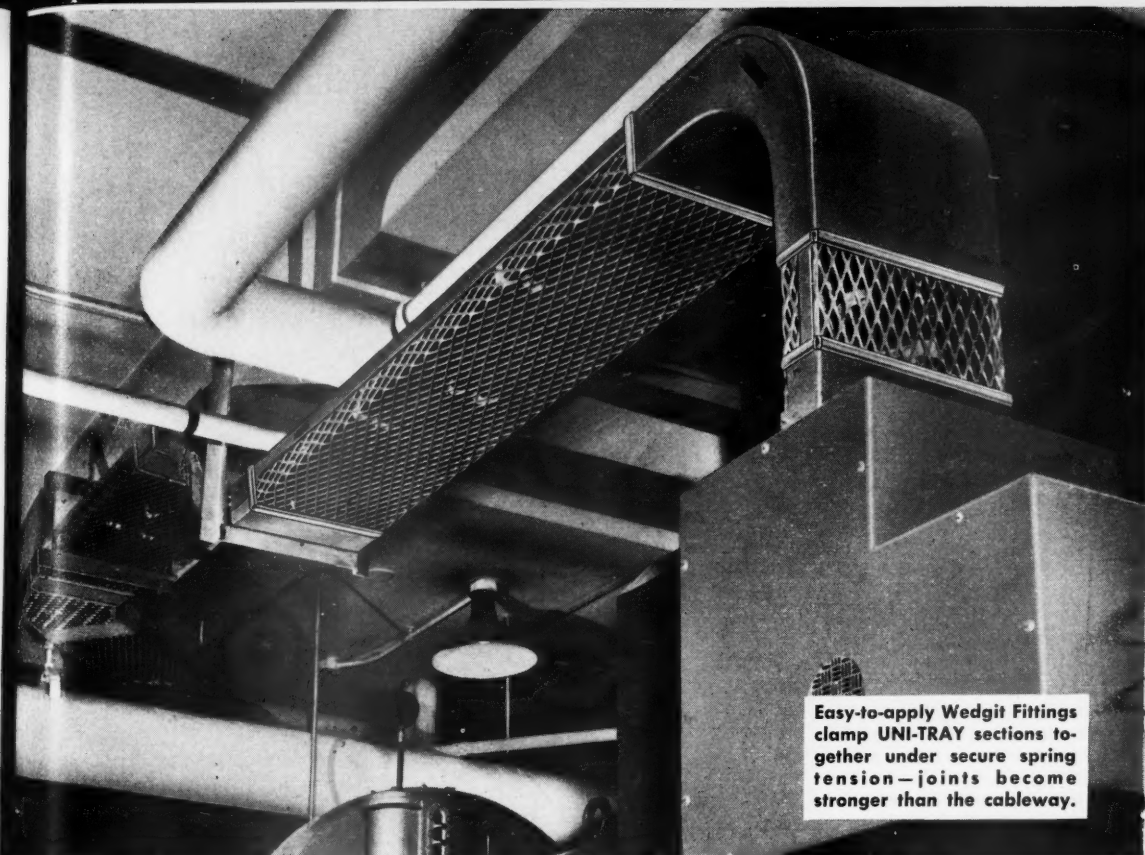
Switching Service Switched. The Missouri commission authorized a carrier in the process of converting from an electric railroad system to a motorbus system to discontinue switching service to a power company and to sell that portion of its properties to the power company; and the commission authorized two railroads to commence rendering such switching service to the power company, upon a showing

that the changes would not be detrimental to the public. *Re Kansas City Pub. Service Co. et al. Case No. 13,583, December 27, 1956.*

Competition in Regulated Industry. The California commission, in passing upon rate applications of motor passenger carriers, commented that, although the preservation of competition is a desirable objective, competition is not indispensable to protect the public interest in a regulated industry. *Re Transcontinental Bus System, Inc. et al. Decision No. 54304, Application Nos. 38017 et al. December 19, 1956.*

Newly Certificated Company's Rates. The California commission considered it proper to permit an applicant which had been granted a certificate of public convenience and necessity to operate a water company to establish rates which were not objectionable to any of the users and which were comparable to rates of existing utilities in the area. *Re Hicks (Palm Valley Water Co.) Decision No. 54306, Application No. 37856, December 21, 1956.*

Certificate Cancellation Not Justified. The Colorado commission dismissed a petition brought to cancel the right of a motor carrier to operate bus service on sightseeing tours because of nonuse and abandonment where the complainants had not sustained the burden of showing an intention on the part of the carrier to abandon use of buses in its operation or any unexplained failure to operate buses. *Colorado Transp. Co. v. Masterson et al. Case No. 5106, Decision No. 45866, May 29, 1956.*



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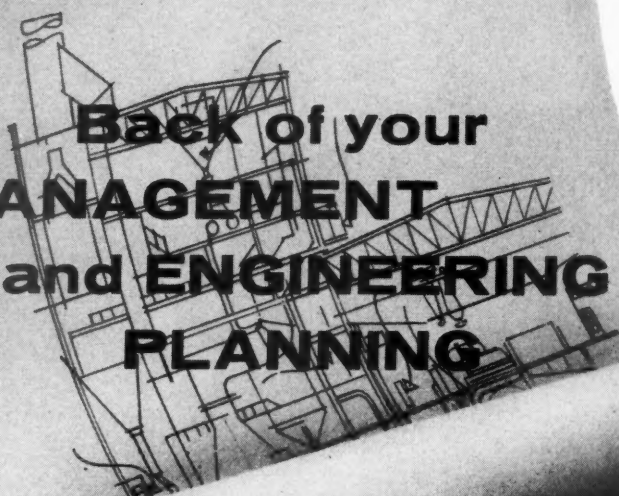


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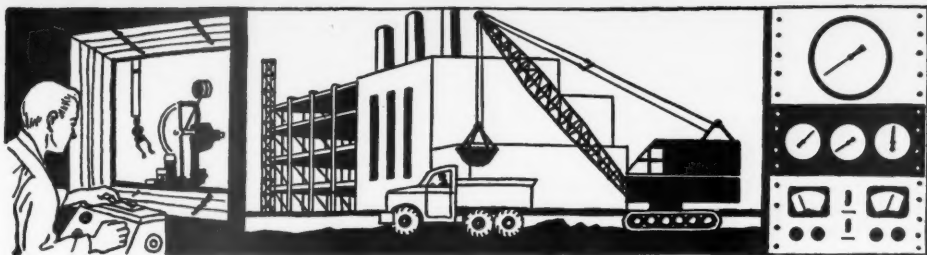
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Industrial Progress

Union Electric of Mo. to Spend \$63,000,000 in 1957

UNION Electric Company of Missouri will spend more than \$63,000,000 in 1957 to meet growing demands for electricity, according to figures just released. Some \$335,000,000 will be spent over the next five years on new and expanded facilities.

The major part of the company's 1957 construction budget will go for new transmission lines, substations, transformers and distribution facilities. Approximately \$41,000,000 will be spent on these items.

Some \$22,000,000 will be spent at the Meramec plant, where construction of a third generating unit has been underway since last summer. Completion of the project is scheduled tentatively for June of 1958.

The new section will house a 280,000 kilowatt turbo-generator, which will double the capacity of the Meramec plant, making it the largest in the Union Electric System.

More than \$45,000,000 was spent on new and expanded facilities last year. This included \$32,000,000 for new transmission and distribution equipment, \$5 million for new generating facilities and \$8 million for other construction and modernization projects.

Southern Company Construction Plans Approved

SOUTHERN Company directors recently approved a 1957 construction program of \$138,870,000, or about one-third of its estimated 1957-59 outlay of \$435,000,000.

This year's budget, largest in history, will be spent by Southern's operating subsidiaries, the Georgia Power Company, Alabama Power Company, Gulf Power Company, Mississippi Power Company and the Southern Electric Generating Company.

The rate of their load growth, the

holding company said, has been slightly over 8 per cent a year for the past 30 years, equivalent to a doubling of the load every nine years.

Generating units totaling nearly a million kilowatts will be completed in the coming three-year period.

\$241,000,000 Program Planned By Texas Eastern Transmission

DETAILS of a \$241,000,000 expansion program were explained by George T. Naff, vice-chairman of Texas Eastern Transmission Corporation at a recent meeting of the New York Society of Security Analysts.

The program, part of which has already been approved by the Federal Power Commission, includes \$64,000,000 already spent for substitute pipeline facilities from Beaumont, Texas, to Kosciusko, Mississippi; \$140,000,000 for construction of additional natural gas lines from Beaumont south to the Mexican border and completion of loop facilities on the company's existing 30-inch line from Kosciusko north to the Oakford storage area in western Pennsylvania; and \$36,000,000 for conversion of natural gas facilities to oil products, including construction of a lateral line through Indianapolis, Indiana, into Chicago. Approval of the latter phase of the program is pending before the FPC.

Gould Appoints Carson I. Simms Manager of Utility Sales

THE appointment of Carson I. Simms as manager of utility sales for the industrial division has been announced by Gould-National Batteries, Inc., Trenton, New Jersey.

Mr. Simms has served as a southern sales representative for Gould since 1951, and in his present position will supervise activities in the application of batteries to telephone service, electric light and power.

New York State Natural Gas Plans \$24,000,000 Expansion

NEW York State Natural Gas Corporation will spend about \$24,000,000 on improvements and additions to its system during the 1956-57 heating period, the company announced.

The company, which supplies gas to 21 major gas distributing companies in Pennsylvania, New York and Ohio, expects to sell 146,790,000 cubic feet of gas in 1957. That would compare with about 131,718,997,000 cubic feet sold in 1956.

New York State Natural Gas expects to have 148,853,824,000 cubic feet of gas in underground storage pools at the end of October this year, a projected increase of more than 12 billion cubic feet over 136,663,711,000 cubic feet in storage at October 31, 1956. That amount exceeded by 10 billion cubic feet the amount in storage at the like period of 1955.

Nickel Cadmium Storage Batteries

TO help engineers evaluate the practicability of miniature Nickel Cadmium Batteries for switchgear, diesel engine starting and portable electrical equipment—NICAD's high output sintered plate nickel cadmium storage batteries are described in an eight-page technical report. Details of development, construction, and operation are shown along with curves of discharge and charge characteristics.

Copies may be obtained from Nickel Cadmium Battery Corporation, 66 Pleasant street, Easthampton, Massachusetts.

NSP Construction Plans For 1957 Total \$43,000,000

NORTHERN States Power Company will invest an estimated \$43,000,000 in new and improved facilities

(Continued on page 30)

INDUSTRIAL PROGRESS—(Continued)

ties during 1957 throughout its four-state system, company officials reported recently.

This is part of NSP's continuous construction program which has seen investments made at an average of more than \$100,000 a day for the past 10 years. From 1947 through 1956, NSP's construction investments totaled \$367,800,000. Future plans contemplate investments at an accelerated pace, estimates for the four-year period 1957-60 totaling \$200,000,000.

"Steady growth in the use of electricity coupled with increased availability and growing use of natural gas require these investments," said Allen S. King, president. "Average residential consumption of electricity in 1956 throughout the NSP service area set a new all-time high record while the unit cost of electricity to consumers continued the downward trend that has seen NSP's average rural and residential rates drop 50 per cent in the last 25 years. Growing use of major appliances and room air conditioners in homes will keep residential power use increasing at its present rate.

"Industrial and commercial use of electricity also set new records boosted

by industrial automation and growing commercial use of air conditioning," Mr. King added.

Conversion to natural gas service in communities where NSP now provides manufactured gas service will be made as soon as natural gas becomes available, Mr. King said.

Full Color Brochure Published By Sargent & Lundy

SARGENT & Lundy, Chicago consulting engineering firm, has recently published a four-color brochure on the occasion of the firm's 65th anniversary. The 40 page booklet describes the full range of services offered to the steam-electric power industry by Sargent & Lundy.

Thirty-three different projects are illustrated and described briefly in the brochure. Included are steam power stations for public utilities, power facilities for industrial concerns, substations and distribution projects, and transmission line work. Also featured is a section dealing with the firm's work in the field of nuclear power engineering.

The majority of the 31 full color photographs used were made especial-

ly for the brochure and are representative of the firm's work during the past 10 years.

Copies may be obtained by writing to Sargent & Lundy, Public Relations Department, Chicago 3, Illinois.

G-E Official Predicts 67% Increase in Electricity Use In Home By 1960

A GENERAL Electric Company executive has predicted that use of electricity in the average American home will increase 67 per cent by 1960.

W. V. O'Brien, vice-president and general manager of the company Apparatus Sales Division, made the forecast at the 1957 Business Outlook Conference sponsored by the Los Angeles Chamber of Commerce.

"Today," Mr. O'Brien said, "the average yearly American power consumption is about 2,995 kilowatt hours per home, but in 1960, we have every hope that this will leap to 5,000—aided by such industry-wide programs as 'Live Better . . . Electrically.'"

He cited other projected increases in electric power consumption on the farm, in industry and in the community, and cautioned that management must now plan years ahead—"even an entire business generation—in order to have a better perspective on the courses that should be taken today.

The General Electric vice-president said that by 1965, the United States with only 14 per cent more people in the labor force, must produce 40 per cent more goods and services to meet projected demand.

"To do that," he said, "either we must all work harder and longer—which is neither a realistic nor a good solution—or we must find and invest in more productive machinery and methods.

"This clearly spells automation. And automation means more and more pieces of electrical and electronics equipment, and a correspondingly climbing rate of electric power consumption."

Gen. Tel. of California Has \$72,000,000 Program

GENERAL Telephone Company of California expects to invest \$72,000,000 in 1957 according to an announcement by Harlan W. Holmwood, executive vice-president. Largest single item in the budget is \$17,183,000 for

(Continued on Page 32)

This announcement is not an offer to sell or a solicitation of an offer to buy these securities. The offering is made only by the Prospectus.

\$35,000,000

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When Tutankhamen, King of Egypt, was put to his rest, it was to be forever. His was to be a permanent monument, and his body was mummified with unique skill. These burial preparations went a long way toward overcoming the destructive effects of time. King Tut's mummy still exists today—over 3,000 years after it was interred in the valley of the tombs of the kings.



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Like King Tutankhamen's mummy, many Kerite Cables are especially built for long-time burial. But these Kerite Cables do not enjoy the favorable dry, almost air-tight conditions of King Tut's tomb. These cables must withstand all the adverse conditions encountered in direct burial in the ground from the Arctic to the Tropics. Yet when these underground cables are unearthed, even after years of service, they are, unlike King Tut, very much alive. The name Kerite is recognized, the world over, as the hallmark of endurance.

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INDUSTRIAL PROGRESS—(Continued)

dial and other equipment in central offices. Other major telephone expenditures will be made for telephone instruments, wiring and additional equipment on customers' premises amounting to nearly \$15,824,000. Outside plant, which covers buildings, cables, wire lines, poles and the thousands of other items which go into outside telephone construction, will amount to \$25,864,000. Land acquisitions and purchases of working tools, vehicles and miscellaneous telephone equipment comprise other requirements.

The company's eastern division, which contains properties in and around the rapidly growing East San Gabriel Valley area, Pomona Valley, Ontario and San Bernardino, has been allotted \$27,255,000 of the 1957 program. An amount of \$15,910,000 will be expended for new facilities in the western division which includes the Santa Monica Bay Area, West Los Angeles, Redondo and Lancaster. Whittier and Downey exchanges, making up the central division, have a \$13,744,000 budget, while the southern division's territory of Long Beach,

Huntington Beach, Westminster and Laguna Beach has programmed \$8,257,000. Santa Barbara, Oxnard, and Santa Maria and surrounding communities in the northern division will receive nearly \$5,846,000 for expansion and service improvement. The San Joaquin area, where General has three exchanges of Reedley, Lindsay and Fowler, will require nearly \$1,003,000 during the next year.

At the end of 1945, General of California had 186,704 telephones compared with nearly 825,000 today. Investment in telephone facilities has skyrocketed from \$30,158,000 in 1945 to better than \$275,000,000 today.

Mr. Holmwood observed that the cost of adding each new telephone has increased sharply since the end of World War II. It now requires about \$404 to provide the facilities for each new telephone, compared with \$161 in 1945. Increased labor costs, as well as substantial raises in costs of basic materials and supplies, are two of the major causes.

During 1956 there were 103,364 new telephones added to the company's California territory which sur-

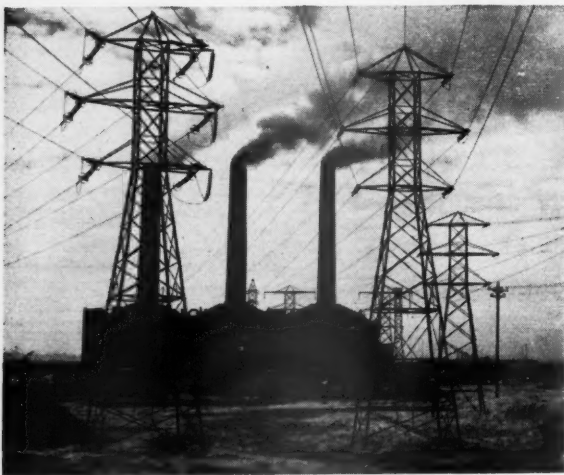
passed any previous year. At the end of that year the company had 819,000 telephones in operation. Over \$273,000,000 was invested in telephone facilities at the close of 1956 as a result of the \$61,878,500 expansion program during the past year. Since 1945 General has increased telephones more than four times and plant investment nine times.

\$47,000,000 Program Planned By Alabama Power

THE directors of Alabama Power Company recently approved a record budget of \$47,000,000 for additions and improvements during 1957. This is more than one and a half times the \$30,500,000 construction and improvement budget in 1956. It is the company's largest construction budget and brings the company's postwar expenditures to over \$341,000,000.

Of the amount budgeted for 1957, approximately \$12,000,000 will be for construction work on 165,250 kilowatt steam generating unit No. 9 at Gorgas expected to go into operation in 1958.

(Continued on page 34)



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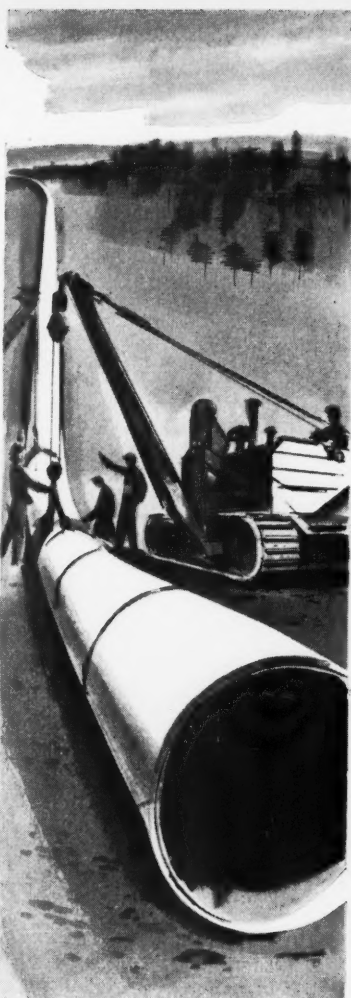
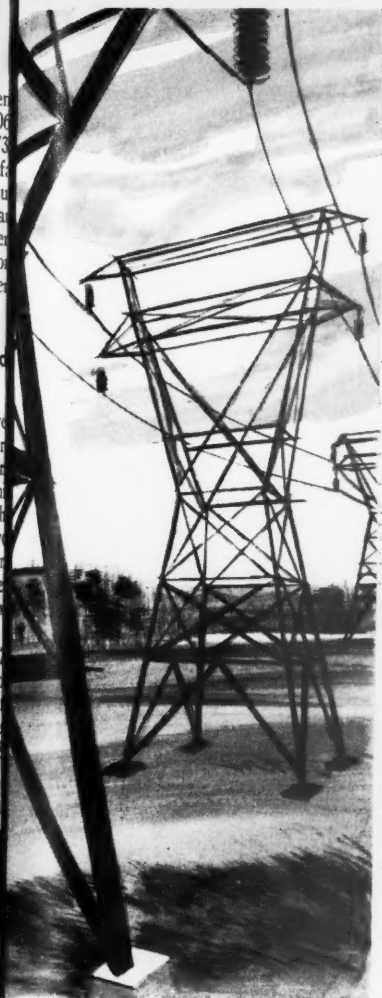
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INDUSTRIAL PROGRESS

(Continued)

First stages of construction of a \$25,000,000 addition to Barry steam plant near Mobile, to nearly double the present capacity of 250,000 kilowatts, will require 3½ million dollars. In anticipation of receiving the licenses for the proposed Coosa and Warrior river projects, more than 3½ million dollars has been budgeted for starting construction work on them.

Improvements at existing steam and hydro plants will cost \$1,200,000. Transmission line additions and improvements, including substations and connections, will total more than \$5,000,000. Improvements in supply facilities and extensions to new and existing customers will cost nearly \$18,000,000. For expansion of and improvements to its Gorgas Coal Mine an investment of 1½ million dollars will be made. More than half a million dollars worth of automotive and other equipment will be bought.

The company expects to complete within the year an office building in Mobile estimated to cost \$1,400,000 and expects to make substantial progress toward the construction of a 1 million dollar addition to its general office building in Birmingham.

Pacific Tel. & Tel. Plans \$93,000,000 Expansion In Wash.-Idaho Div.

PACIFIC Telephone & Telegraph Company's Washington-Idaho division plans a \$93,000,000 construction program in the next two years, W. J. Billings, division manager, reported.

The expected 1957 expenditure of \$51 million will be close to the record \$53 million spent in 1956, which compared with the previous record of \$34,300,000 spent in 1955.

The 1957 program will include \$2 million for new equipment for local and long distance calls, \$12.5 million for outside lines and facilities for local exchanges, and \$12 million for new telephones and wiring on customers' premises.

Southwestern Bell Plans \$115,000,000 Outlay in Texas

SOUTHWESTERN Bell Telephone Company plans to spend more than \$115,000,000 in Texas during 1957 for new equipment and buildings. General Manager R. A. Goodson said. According to the company, this is the biggest telephone construction program in Texas history.

During 1956, Southwestern Bell spent \$111,000,000 on construction.

(Continued on page 36)

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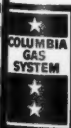
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INDUSTRIAL PROGRESS—(Continued)

Texas, adding 146,000 telephones; bringing the total in service at year's end to 2,240,000. The company expects to add approximately as many telephones in 1957 as were added in 1956, according to Mr. Goodson.

\$51,000,000 Construction Budget Set by Georgia Power

A 1957 construction budget of more than \$51,000,000, the largest in the Georgia Power Company's history, was approved recently by the company's board of directors. This figure compares with \$40,000,000 spent in 1956.

John J. McDonough, president, said the largest single item in the budget is the continuation of work on two 125,000-kilowatt generating units at plant Yates near Newnan. The first of the two new generating units will come into service in June of 1957 and the second in June of 1958.

Work will be started during the year on the construction of the Oliver dam on the Chattahoochee river at Columbus, provided a license for the Middle Chattahoochee development is received from the Federal Power Commission. The plant is expected to be completed in 1959.

Construction of a second unit of 75,000 kilowatts will be begun at plant McManus, the company's steam-electric generating plant at Brunswick. Completion is scheduled in 1959.

Major construction projects which will serve to enlarge and strengthen the company's transmission system are as follows: a 20,000-kilowatt substation at Millen, a 20,000-kilowatt substation in the southeast section of Atlanta, an 18,000-kilowatt substation in the Chamblee area, completion of a 20,000-kilowatt substation at Cedartown, a 44,000-volt transmission line from Bluffton to Cuthbert, a 44,000-volt transmission line from Plant Mitchell to Camilla.

Additional substations and connecting transmission lines will be constructed at Doraville, Thomson, Wesleyan College, Clayton, Lavonia, Gainesville, Smyrna, Pleasantville, Alpharetta, Statesboro, Pembroke, Summerville, and in the Clark Hill reservoir area.

N. E. Farm Electrification Institute Meets

ABOUT 150 members of the 18th New England Farm Electrification Institute convened on January 30th in Rutland, Vermont for a three-day session of discussions and activities related to rural electricity, Albert A. Cree, president, Central Vermont Public Service Corp., and L. Douglas Meredith, president of the New England Council, were the principal speakers at a banquet Thursday evening; at the Hotel Berwick winding up the Institute's activities. Mr. Cree, a director of Yankee Atomic Electric Company, spoke on "Atomic Energy

and the New England Farmer." Meredith's topic was "The New England Council and New England Agriculture."

The Institute is scheduled to meet in Massachusetts in 1958.

Phoenix Site of Solar Furnace Conclave

FOURTEEN papers or more were presented at the Solar Furnace Symposium in Phoenix, Arizona on Monday, January 21st. While largely technical in content, the diversity of approach and the sources of the contributions indicated a wider interest in the topic than thought possible. The Symposium was sponsored by the Association for Applied Solar Energy and co-sponsored by the Arizona State College at Tempe, Stanford Research Institute and University of Arizona. A rather thorough, introductory coverage was provided in the comments of C. C. Furnas, Assistant Secretary of Defense for Research and Development. Furnas suggests that through solar heat and the raw chemical materials of nature, man someday may be able to solve his liquid and gaseous fuel requirements.

Others contributing to the Symposium in Phoenix were: W. M. Tudenham, Kennecott Copper Corp. (Solar Furnace Research in Non-Ferrous Metallurgy); Frank E. Elin, E. I. du Pont de Nemours & Co. (Industrial Considerations); Peter Glaser, Arthur D. Little, Inc., (Solar Furnace Applied Research); George Leslie E. Simon, Carborundum Co. (High Temperatures and New Materials); Paul Jose, Holloman Air Force Base, (Heliostat Design For Large Furnaces); Heister, Tietz and De La Rue, Stanford Research Institute (Economic Factors in Furnace Design); A. R. Kassander, University of Arizona, (Fuel for Solar Furnaces); R. W. Bliss, Jr., Donovan Bliss, (Designing for Specific Performance); Davies and Cotton, Quartermaster Research & Development Command, (Design); Bussell, Lind, Kopa and Gwynne, University of California, (Control of Thermal Radiation); De La Rue, Loh, Brenne and Hiester, Stanford Research Institute, (Flux Distribution near the Focal Plane); C. J. Kevane, Arizona State College at Tempe, (Construction and Operation of the Arizona State College Solar Furnace); and R. H. Wight, Pittsburgh, Pa., (Materials and Surfaces for Solar Furnaces).

Common and Preferred Dividend Notice

January 30, 1957

The Board of Directors of the Company has declared the following quarterly dividends, all payable on March 1, 1957, to stockholders of record at close of business, February 8, 1957:

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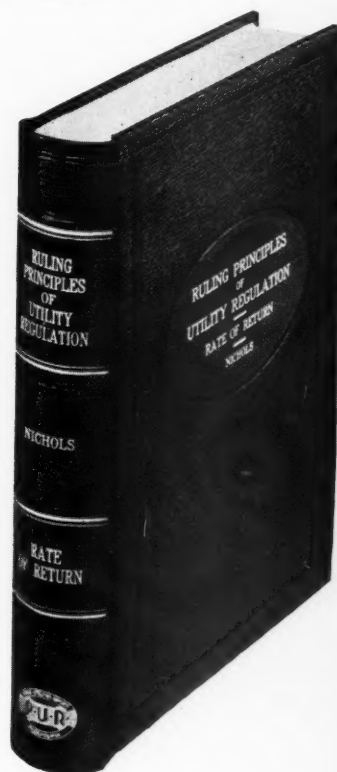
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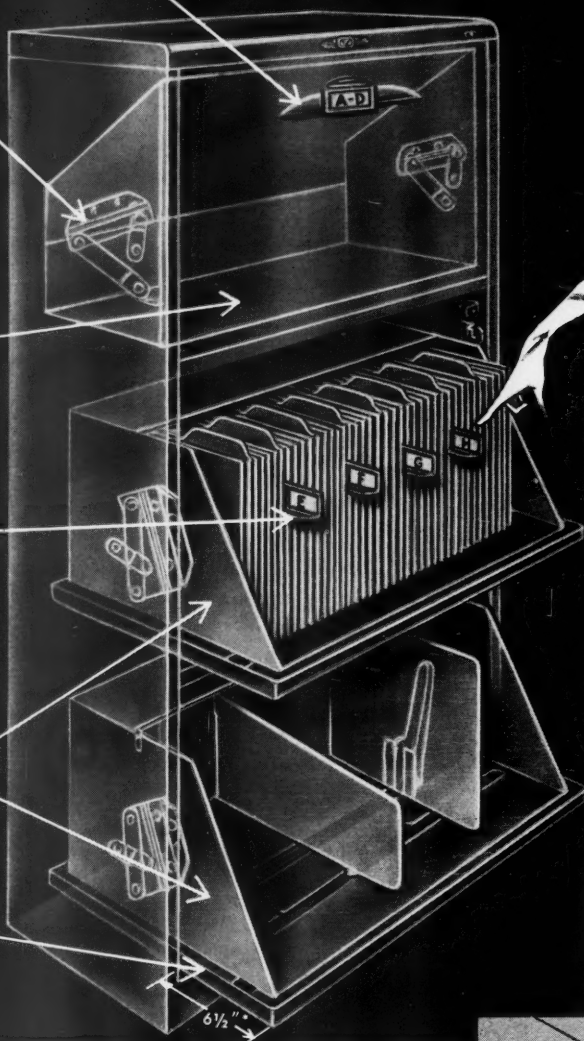
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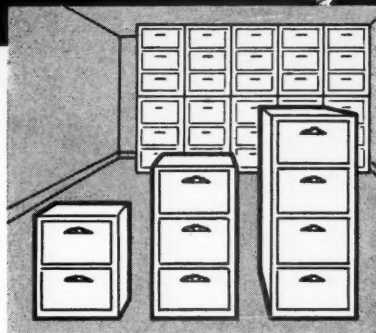
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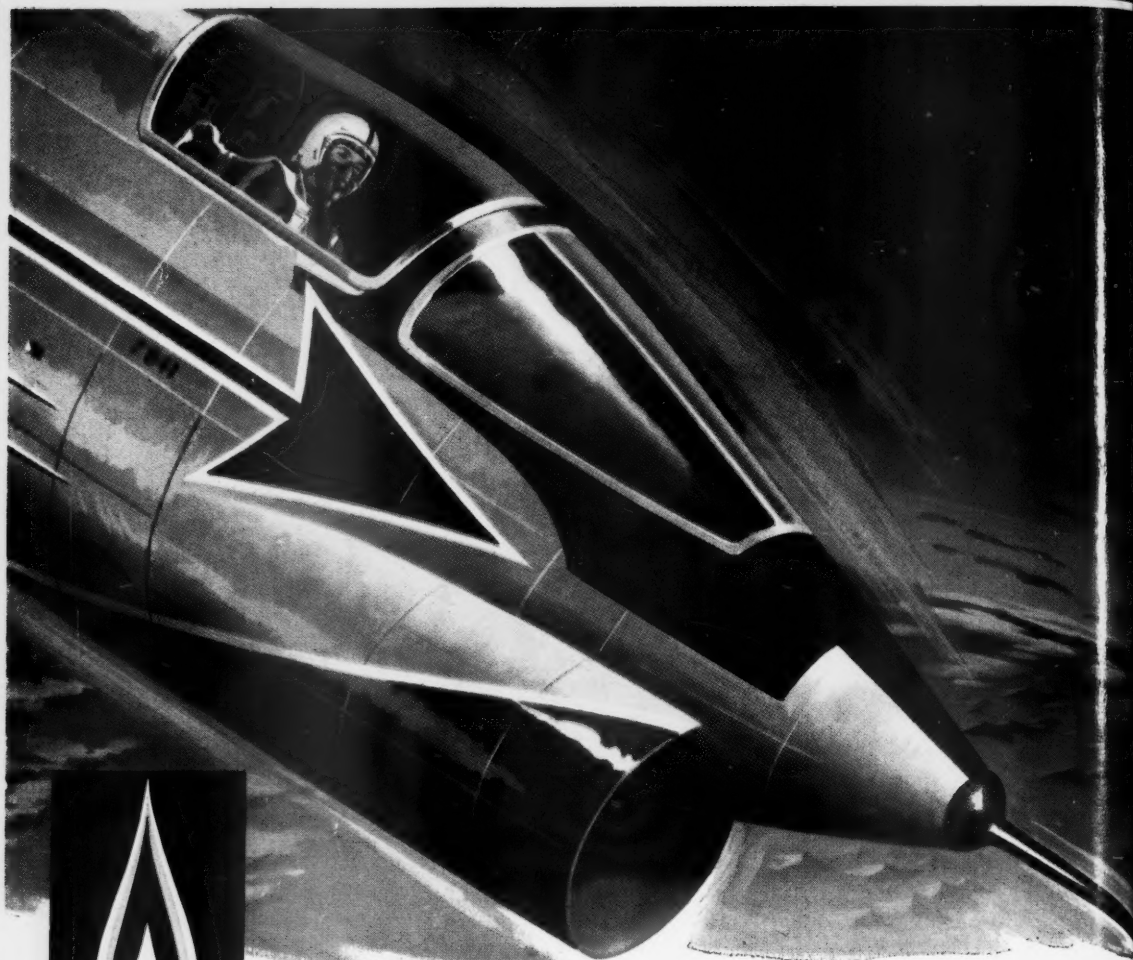
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